AD-A075 858 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. HEMLOCK LAKE DAM, INVENTORY NUMBER--ETC(U)
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Genesee River Basin, Livingston County, New York
Inventory No. NY 477

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This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Hemlock Lake Dam did not reveal any conditions which pose an immediate threat to life or property. Total spillway discharge capacity not sufficient to pass RMF. Consequently, spillway capacity is considered inadequate. Several deficiencies noted.

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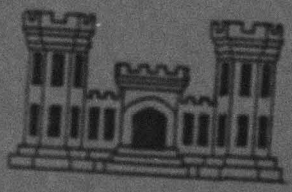
GENESEE RIVER BASIN

HEMLOCK LAKE DAM

LIVINGSTON COUNTY, NEW YORK
INVENTORY No. NY 477

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



CONTRACT NO. DACW-51-79-C0001

NEW YORK DISTRICT CORPS OF ENGINEERS

SEPTEMBER 1979

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

GENESEE RIVER BASIN
HEMLOCK LAKE DAM
I.D. No. N.Y. 477
Phase I Inspection Report

TABLE OF CONTENTS

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Hemlock Lake Dam - I.D. No. N.Y. 477
State Located:	New York
County:	Livingston
Watershed:	Genesee River Basin
Stream:	Springwater Creek
Date of Inspection:	June 13, 1979

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property.

Several deficiencies were noted on this structure. Portions of the riprap on the upstream face to the west of the spillway had been damaged by wave action. Wave action has also formed triangular voids in the corners of a number of the concrete slabs on the upstream slope to the east of the spillway. Other deficiencies include the spalling and deteriorated concrete on the spillway structure and the trees growing on the downstream slope of the eastern end of the dam.

These deficiencies should be corrected within a period of 1 year of the date of final approval of this report.

The total discharge capacity of the spillway is not sufficient to pass the Probable Maximum Flood (PMF). However, the discharge capacity is sufficient with one or more stopgates operational to pass one-half the PMF. Therefore, the spillway capacity is considered to be inadequate.

George Koch

George Koch
Chief, Dam Safety Section
New York State Department of
Environmental Conservation
NY License No. 45937

Approved By:

Clark H. Benn

Col. Clark H. Benn
New York District Engineer

Date:

28 September 79

OVERVIEW
HEMLOCK LAKE DAM
I.D. No. N.Y. 477

HEMLOCK LAKE DAM
I.D. No. N.Y. 477
#41D-326
GENESEE RIVER BASIN

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase 1 inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenant Structures

The Hemlock Lake Dam is an earth dam with an overflow spillway channel near the center of the structure. The embankment has a maximum height of 12 feet and a length of 3200 feet. The crest is 20 feet wide. The embankment slopes on the upstream face are 1 vertical on 3 horizontal. On the downstream face, the embankment slopes vary from 1 vertical on 3 horizontal on either end to 1 vertical on 1½ horizontal in the center section. The portion of the upstream face to the east of the principal spillway has been armored with concrete slabs for wave protection. The remainder of the upstream slope is covered with stone paving and riprap.

The spillway is a concrete ogee section with a foot bridge crossing the top. Concrete piers for the bridge divide the spillway into eight bays each 8.1 feet wide. The opening between the bottom of the bridge and the crest of the ogee on each of the bays is 8.5 feet. There are provisions for channel stopgates to be placed in each of the bays.

Concrete wingwalls form the approach channel to the spillway and the channel beyond the ogee section. The channel bottom upstream of the spillway crest is stone paving while downstream of the crest the bottom is lined with concrete. The ogee section and the wingwalls are supported on timber piles. A row of steel sheet piling extends approximately 30 feet below the upstream toe of the ogee section. This row of sheeting also extends beyond both ends of the spillway.

The outlet to a 60-inch diameter conduit which carries a portion of the flow from the Canadice Outlet into this reservoir is a concrete structure located 300 feet east of the spillway on the upstream slope of the embankment. The inlet to this conduit is at the Curve Dam on the Canadice Outlet.

The intake structure for the water supply system is located on the eastern end of the dam. It consists of a 60-inch pipe which extends approximately 1500 feet out into the lake. Gravity withdrawal from the lake is possible down to a lake level elevation of 887.3. Two centrifugal, low-lift pumps are available which may be used to draw the lake level down to about elevation 878.3.

b. Location

The dam is located at the northern end of Hemlock Lake on Harder Road in the Town of Livonia. The dam is approximately ½ mile from New York State Route 15A and is 1½ miles south of the Village of Hemlock. The stream flowing into the lake is the Springwater Creek, but downstream of the dam it is known as the Hemlock Outlet.

c. Size Classification

The dam is 12 feet high and the reservoir has a storage capacity of 41,101 acre-feet. Therefore, the dam is in the intermediate size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The dam is classified as "high" hazard due to the presence of the Village of Hemlock approximately 1½ miles downstream of the dam.

e. Ownership

The dam is owned by the City of Rochester, New York. Mr. Ray Lawrence and Mr. Om Popli from the City Department of Engineering and Maintenance were contacted concerning the inspection. Their address is City Hall, Room 326B, 30 Church Street, Rochester, New York 14614. The Department's phone number is (716) 428-6844.

f. Purpose of Dam

The dam provides a reservoir for water supply for the City of Rochester.

g. Design and Construction History

The dam was originally constructed by the City in the early 1870's. Major revisions to the structure were made in 1926. The revisions involved raising the crest of the dam by five feet and reconstructing the spillway. These revisions were designed by the City of Rochester's Department of Engineering. Construction plans and specifications were available for this reconstruction.

The existing spillway section was constructed in 1935. Engineers from the City's Department of Public Works designed the spillway structure. Plans for these revisions were available and have been included in Appendix F.

h. Normal Operating Procedures

The reservoir is operated as a part of the water supply system for the City of Rochester. The inflow from the conduit connecting the Canadice Outlet to this reservoir can be regulated by a gate on the conduit at the Curve Dam. Water is withdrawn from the reservoir as required through the intake structure for the water supply system. The maximum possible outflow through the water supply conduits is 72.7 cfs for gravity flow and 46.7 cfs for pumped output when the lake level drops below elevation 887.3.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.)	43.13
b. Discharge at Dam	(cfs)
Spillway (water level at embankment crest)	-
Existing stopgates - (closed)	2,992
One end stopgate - (fully open)	6,896
Both end stopgates - (fully open)	10,799
Water supply conduits - (lake level above elev. 887.3 gravity flow)	73
Water supply conduits - (lake level below elev. 887.3 pumped output)	47
c. Elevation (USGS Datum)	
Top of Dam	909.8
Spillway Crest	900.8
Pipe invert - water supply outflow	887.3
d. Reservoir Surface Area	(Acres)
Spillway Crest	2,054
e. Storage Capacity	(Acre-Feet)
Top of Dam	41,101
Spillway Crest	22,356

f. Dam

Earth embankment with concrete slabs and riprap wave protection on upstream slope and a grassed downstream slope.

Embankment Length (feet)	3,200
Slopes (V:H) Upstream	1 on 3
Downstream Varies from	1 on 1½ to 1 on 3
Crest Elevation	909.8
Crest Width (ft.)	20

g. Spillway

Type: Concrete ogee with concrete foot bridge crossing top. Bridge piers divide channel into 8 bays, each 8 feet wide by 8.5 feet high. Provisions made for channel stop-gates in each of the bays.

Length (feet)	64.0

h. Reservoir Drain
See Appurtenant Structures - Water Supply Conduits.

i. Appurtenant Structures
1) Diversion Conduit From Canadice:

60-inch concrete conduit; 3,800 feet long; carries up to 162 cfs from Curve Dam on Canadice Outlet into Hemlock Lake with concrete outlet structure on upstream face of Hemlock Lake Dam.

2) Water Supply Conduits:

Intake consists of a 60-inch diameter pipe which extends approximately 1,550 feet into the lake. Maximum output 72.7 cfs in gravity flow. 46.7 cfs pumped output when lake level drops below elevation 887.3.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The Hemlock Lake Dam is located in the glaciated Alleghany Plateau physiographic province of New York State. The dam is in one of the Finger Lakes' troughs, which are glacially modified valleys of preglacial rivers. The bedrock in the area consists primarily of Early Upper Devonian Era shales, siltstones, and sandstones. The surficial soils are the result of glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation.

b. Subsurface Investigations

The subsurface information available was limited to general descriptions supplied on old dam inspection reports. These reports indicate that the soil in the area is predominantly glacial till.

c. Embankment

Only limited data was available concerning the design of the embankment. This data consisted of construction specifications from the 1926 contract, which established material and compaction requirements for the embankment.

2.2 CONSTRUCTION RECORDS

Some construction records were available from the 1926 contract, which raised and enlarged the existing dike. Plans, construction specifications, and correspondence concerning construction were used in the preparacion of this report.

2.3 OPERATION RECORDS

The dam is visually inspected on an irregular basis. Lake levels are recorded daily by the City of Rochester's Bureau of Water. These records are kept at the Bureau's office at 10 Felix Street in Rochester.

2.4 EVALUATION OF DATA

The data presented in this report was obtained from the Department of Environmental Conservation files and from the records of the City of Rochester. Subsurface information was limited, but overall, the information available appears to be adequate and reliable for Phase 1 inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Hemlock Lake Dam was conducted on June 13, 1979. The weather was sunny and the temperature was in the mid-sixties. The water surface at the time of the inspection was approximately 1 foot above the spillway crest. However, no water was flowing over the spillway since there were a minimum of 2 feet of flashboards in place in each of the eight bays of the spillway.

b. Embankment

Most of the embankment was grass covered and in good condition. However, visual inspection revealed several minor deficiencies. The most serious of these deficiencies was failure of the riprap on the upstream slope of the embankment, west of the spillway. Several areas on the riprap had been scoured and subsided due to wave action. The worst depression was adjacent to the spillway channel where the slope paving had dropped by as much as 2 feet. The slope had been partially regraded with additional riprap. Other deficiencies observed included several trees growing on the downstream slope of the embankment on the eastern end of the structure and small voids between some of the concrete slabs on the upstream face. There were also larger voids on a number of the slabs where one corner had been removed by wave action leaving triangular voids 1 foot long by 1 foot deep.

c. Spillway

The spillway was generally in satisfactory condition. No deficiencies were noted on the ogee section, the flashboards, or the downstream apron. The concrete on the upstream portion of the structure was somewhat deteriorated and spalling. There was some minor cracking and separation of patching material on the eastern wingwall upstream of the ogee section. There are mechanical hoists in place on two of the eight bays which are used to raise the flashboards. These two devices, which were located above the outermost bay on either end of the spillway, appeared to be operational.

d. Appurtenant Structures

The appurtenant structures at this location are the concrete inflow structure, which brings a portion of the outflow from Canadice Lake into this lake and the intake for the City of Rochester's water supply system. No deficiencies were observed on either of these structures.

e. Downstream Channel

The outlet channel consisted of the concrete lined apron and vertical concrete walls to a point where it passed under a bridge for a town road, which ran along the toe of the dam. Beyond the bridge, there was a steel bin type retaining wall, which was corroded at the water surface elevation. The channel downstream of this point was cut into natural soil with no severe side slope erosion or debris obstructions in evidence.

f. Reservoir

There were no signs of soil instability in the reservoir area.

3.2 EVALUATION OF OBSERVATIONS

Visual inspection of this structure revealed the following deficiencies:

1. The areas to the west of the spillway which had been scoured resulting in a series of depressions in the riprap;

2. The trees which were growing on the downstream slope of the dam on the eastern end of the structure;

3. Triangular voids at the corners of a number of the concrete slabs on the upstream face;

4. The deteriorated concrete on the spillway and on the retaining walls which form the approach channel to the spillway.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURE

This reservoir is operated as the primary source to the City of Rochester's upland water supply system. Water is withdrawn through the 60-inch diameter intake which extends into the lake. Gravity withdrawal from the lake is possible down to the lake level of 887.3. The lake level may then be lowered to elevation 878.3 by the operation of two centrifugal, low-lift pumps.

Flows may also be controlled by the addition or removal of stop-gates in the spillway. At present, there are mechanical hoists in place on two of the eight bays. These hoists may be used for the removal of the stopgates. The other stopgates can only be removed by using a mobile crane located on the embankment.

4.2 MAINTENANCE OF DAM

The dam is maintained by the City of Rochester. Grass on the embankment is mowed regularly and the pumps for the intake conduit are tested monthly. Other minor maintenance functions are performed as necessary.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system is present.

4.4 EVALUATION

While the operation procedures of this structure appear to be satisfactory, maintenance procedures are deficient. Additional maintenance efforts are required on certain portions of the structure. The concrete on the spillway is spalling and deteriorated, and portions of the riprap on the upstream slope need to be regraded.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The delineation of the contributing watershed to this dam is shown on the map entitled "Drainage Area - Hemlock Lake Dam" (Appendix C). The irregular-shaped watershed of over 43 square miles lies primarily between two ridgelines. The relatively steep forested slopes extend upward from the edge of Hemlock Lake (at elevation 901) to the ridges at elevations ranging from 1380 to 2230. Runoff enters the lake directly from the surrounding watershed through numerous small streams and a larger stream, Springwater Creek, with its tributary, Limekiln Creek. The heavily wooded strip of land immediately adjacent the lake is owned and controlled by the City of Rochester and is used as a buffer between the lightly populated residential development within the watershed and the lake itself.

5.2 ANALYSIS CRITERIA

A limited amount of hydrologic/hydraulic information was obtained from the City of Rochester, Bureau of Water (see Appendix C). This data (ref. 7) concerned itself with elevation-storage capacity quantities, watershed characteristics, and water supply withdrawal rates.

The analysis of the spillway capacity of this dam was performed using the Corps of Engineers HEC-1 computer program, Dam Safety version. This program develops an inflow hydrograph based upon the "Snyder Synthetic Unit Hydrograph" concept and then flood routs this hydrograph using the "Modified Puls" method, both through the reservoir and over the spillway. The spillway design flood selected for analysis was the Probable Maximum Flood (PMF) in accordance with the recommended guidelines of the U.S. Army Corps of Engineers.

5.3 SPILLWAY CAPACITY

The concrete ogee-shaped spillway plus the stopgates act in conjunction with the earth embankment in forming the dam at the outlet to Hemlock Lake. The 8 stopgates are 8 feet wide each and can be raised to an opening height of 8.5 feet. Only the two end stopgates have installed an operational lift machinery; the interior six stopgates can be removed only by using a mobile crane. The operation of the stopgates was a reasonable assumption made during the analysis, because of the nearby location of the water treatment plant's operator. The end stopgates were analyzed for orifice flow conditions and the interior stopgates for weir flow conditions. The following table indicates the conditions analyzed:

ANALYSIS CONDITIONS	ONE-HALF PMF			PMF		
	Peak Inflow	Peak Outflow	Depth Above 909.8*	Peak Inflow	Peak Outflow	Depth Above 909.8*
1) All stopgates closed (existing on 6/79)	18579	9558	0.72	37157	32728	2.01
2) One end stopgate operational	18579	6802	-0.10	37157	31636	1.76
3) Both end stopgates	18579	8795	-1.28	37157	30139	1.48

Spillway Capacity:

Condition 1)	2992
2)	6896
3)	10799

*Top-of-Dam (Embankment): Elevation 909.8

NOTE: Storage is not allowed to drop below elevation 903.9

The spillway does not have sufficient capacity for discharging the peak outflow from the PMF. For this storm event, the peak inflow is 37,157 cfs and the peak outflow is 30,139 cfs for both end stopgates being operational. However, there is sufficient capacity for discharging the peak outflow of 8,795 cfs from one-half the PMF. Therefore, the spillway is assessed as inadequate.

5.4 RESERVOIR CAPACITY

The normal water surface is at or near the top of the lowest stopgate (elevation 903.95). Storage capacity for that elevation is 28,917 acre-feet. Surcharge storage capacity to the top-of-dam (embankment) elevation at 909.8 adds 12,184 acre-feet; equivalent to 5.3 inches of direct runoff over the entire drainage area. The total storage capacity of the dam is 41,101 acre-feet.

5.5 FLOODS OF RECORD

The maximum known flood occurred on June 23, 1972 from tropical storm Agnes when the water surface exceeded elevation 906. The actual spillway discharge was not known.

5.6 OVERTOPPING POTENTIAL

Analyses indicate the spillway does not have sufficient discharge capacity for the PMF. The computed depths of overtopping for this storm event are 2.01 feet, 1.76 feet, or 1.48 feet, respectively, depending upon the operation of the end stopgates (see table - above). For the one-half PMF event with end stopgates operational, the maximum water surface rises to 0.10 feet (one stopgate) and 1.28 feet (two stopgates), respectively, below the top-of-dam.

During March, 1979, a storm with winds of 70-80 mph occurred over the Hemlock Lake area. The initial spring high lake level and the resulting wave action resulted in spray being carried over the embankment and to the roadway bridge. The embankment was not overtopped by the lake.

5.7 EVALUATION

This dam has sufficient spillway capacity to adequately discharge the peak outflow from one-half the PMF with one end stopgate operational. It does not have sufficient discharge capacity for the PMF event. Therefore, the spillway is assessed as inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observation of the structure did not reveal any signs of major distress. The upstream slope on the western end of the structure was slightly irregular with depressions which had been caused by wave action.

b. Data Review and Stability Evaluation

The primary source of structural and subsurface information for this dam was the set of plans from the 1935 reconstruction of the spillway section. Information contained on these plans was used to perform a structural stability analysis on this portion of the dam. The following conditions were analyzed:

a. Normal conditions with reservoir at the spillway crest;

b. Reservoir at spillway crest with ice load of 5000 lb./ft.;

c. ½ PMF, water flowing over the spillway crest to a depth of 7.72 feet.

The structural stability of the spillway section under the PMF condition was not analyzed. Since the earth embankment would be overtopped under this condition, the dam is not considered capable of withstanding the flows resulting from the PMF.

The analyses performed (see Appendix D) indicate that the factors of safety against overturning and sliding are as follows:

	Case	Factors of Safety: Overturning	Factors of Safety: Sliding
a.	Reservoir level at spillway crest, no ice;	3.19	5.07
b.	Reservoir level at spillway crest, ice load of 5000 lb./ft.;	1.65	1.73
c.	½ PMF, water flowing 7.72 feet over the spillway crest.	2.31	1.96

The safety factors against sliding are slightly below recommended values for both the ice load and the ½ PMF conditions. However, the analysis did not include the lateral resistance to movement of the timber piles which support the structure. This lateral resistance would help increase the safety factors.

d. Seismic Stability

The dam is located in Seismic Zone 2. While the dam appears to be relatively stable, a seismic stability analysis was performed in accordance with Corps of Engineer's guidelines. The seismic analysis was performed for normal conditions with the water level at the spillway crest. The safety factor against overturning with seismic considerations included is 2.98 and against sliding is 2.88.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase 1 inspection of the Hemlock Lake Dam did not reveal conditions which constitute a hazard to human life or property. No signs of instability were observed on the earth embankment. The deficiencies which were noted on this structure were relatively minor in nature and do not pose serious hazards to safety.

b. Adequacy of Information

The information available for the preparation of this report was adequate. The only exception was the subsurface information, which was rather limited.

c. Need for Additional Investigation

No additional investigations are needed at this time.

d. Urgency

The deficiencies outlined in Section 7.2 should be corrected within 1 year of the date of final approval of this report.

7.2 RECOMMENDED MEASURES

a. The damaged portions of the riprap on the upstream face to the west of the spillway should be repaired. In addition, actions should be taken to prevent the scour problem from occurring in the future.

b. Triangular voids which exist at the corners of many of the concrete slabs on the upstream slope to the east of the spillway should be repaired.

c. The deteriorated concrete on the spillway and on the retaining walls for the spillway should be repaired.

d. The trees which are growing on the downstream slope of the eastern end of the dam should be cut.

APPENDIX A

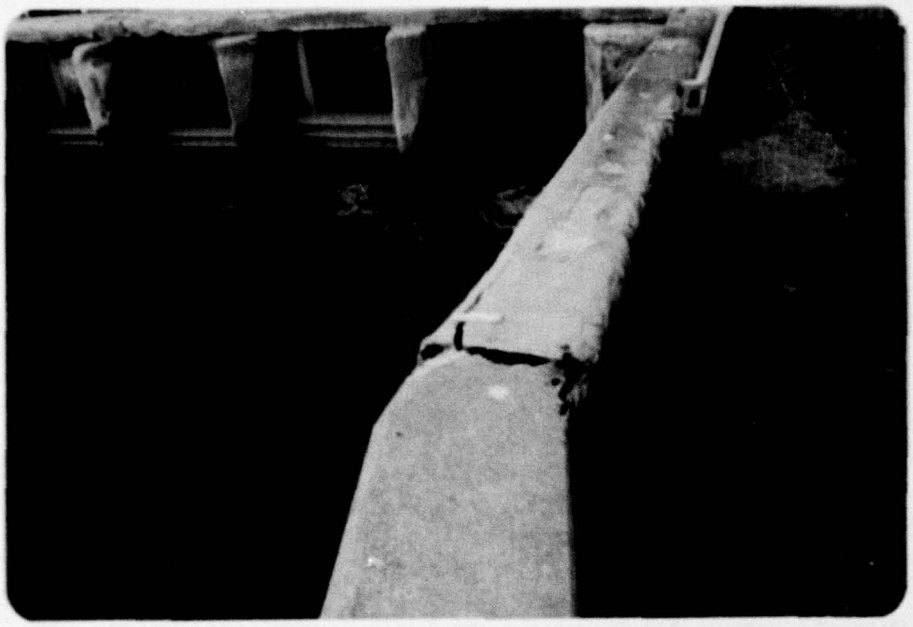
PHOTOGRAPHS

Riprap on Western End of Dam -
Gray Stone Placed Due to Damage by Wave Action

Depression on West End of Spillway Caused by Wave Action

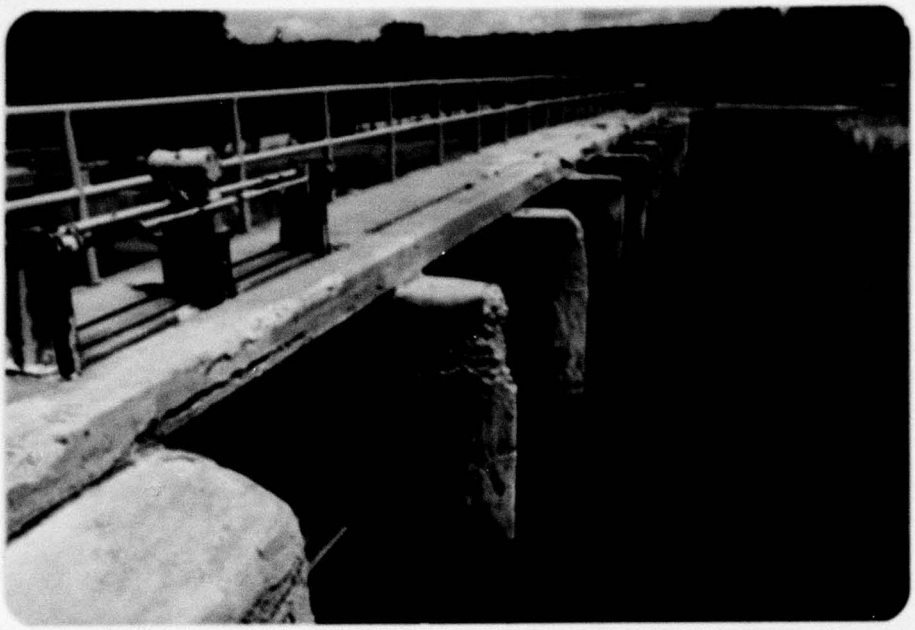
Spillway Section - Channel Stopgates in Place

Spillway - Downstream Portion of Ogee Section



Crack in Patching Material on Wingwall at East End of Spillway

Deterioration of Concrete on Wingwall on East End of Spillway



Deteriorated Concrete on Piers and Bridge Deck; also,
Lifting Device Used for Raising Stopgates

Outlet to Diversion Conduit From the Canadice Outlet

Trees Growing on Downstream Slope at Eastern End of Dam

Eastern End of Dam With Building Housing
The Intake to Water Supply System

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam HEMLOCK LAKE DAM

I.D. # NY-477

Location: Town LIVONIA County LIVINGSTON

Stream Name SPRINGWATER CREEK

Tributary of GENESEE RIVER

Latitude (N) 42°-47'-12" Longitude (W) 77°-37'-00"

Hazard Category C

Date(s) of Inspection 4/13/79

Weather Conditions 65° CLEAR

b. Inspection Personnel R. WARRENDER W. LYNICK

c. Persons Contacted R. LAWRENCE O. POPLI (CITY OF ROCHESTER)

d. History:

Date Constructed ORIGINALLY - 1870's MAJOR REVISIONS - 1924 & 1936

Owner CITY OF ROCHESTER

Designer CITY OF ROCHESTER

Constructed by

2) Technical Data

Type of Dam EARTH WITH CONCRETE SPILLWAY STRUCTURE

Drainage Area 43.13 SQ MILES

Height 12' Length 3200'

Upstream Slope 1V:3H Downstream Slope 1V:3H TO 1V:1.5H (VARIABLE)

3) Embankment

EARTH WITH UPSTREAM SLOPE PROTECTION { WEST - RIPRAP / EAST - CONCRETE SLABS

a. Crest

(1) Vertical Alignment SATISFACTORY ; SLOPING CREST - INTENTIONAL

(2) Horizontal Alignment CURVILINEAR ; SATISFACTORY

(3) Surface Cracks NONE

(4) Miscellaneous

b. Slopes

(1) Undesirable Growth or Debris, Animal Burrows NONE

(2) Sloughing, Subsidence or Depressions RIPRAP SUBSIDENCE ADJACENT TO WEST ABUTMENT SPILLWAY WALL

(3) Slope Protection WEST OF SPILLWAY - RIPRAP SUBSIDENCE ; SCOUR AREA
EAST OF SPILLWAY - CONCRETE SLABS : SEVERAL LOCATIONS WHERE SLAB CORNERS WERE BROKEN, LEANING, TRIANGULAR HOLES, MINOR SLAB CRACKING, CHIPPED CONCRETE @ SLAB JOINTS (IN AREA OF WATER LEVEL FLUCTUATION)
MINOR SLAB EDGE-VERTICAL DISPLACEMENT
SOME SLAB SURFACE SPALLING

(4) Surface Cracks or Movement at Toe NA

(5) Seepage NONE

(6) Condition Around Outlet Structure SATISFACTORY

c. Abutments

EXISTING GROUND

(1) Erosion at Embankment and Abutment Contact NONE

(2) Seepage along Contact of Embankment and Abutment NONE

(3) Seepage at toe or along downstream face NONE

d. Downstream Area - below embankment

WETLAND WITHIN 300' OF TOE

(1) Subsidence, Depressions, etc. NONE

(2) Seepage, unusual growth NO

(3) Evidence of surface movement beyond embankment toe NONE

(4) Miscellaneous

e. Drainage System

NONE

4) Instrumentation

(1) Monumentation/Surveys NA

(2) Observation Wells NA

(3) Weirs NA

(4) Piezometers NA

(5) Other

5) Reservoir

a. Slopes FORESTED TO EDGE OF LAKE

b. Sedimentation NONE APPARENT ; SOIL IS ERODIBLE IN THE WATERSHED AREA

6) Spillway(s) (Including Discharge Conveyance Channel)

CONCRETE OGEE SECTION W/ 8 BAYS INCL. STOPGATES DISCHARGING INTO A CONCRETE LINED CHANNEL LEADING TO A 2-SPAN BRIDGE

a. General SATISFACTORY ; MINOR CONCRETE SPALLING ON PIER NOSES & SPILLWAY FOOTBRIDGE

b. Principle Spillway SATISFACTORY

EASTERN WINGWALL (UPSTREAM) - SOME CONCRETE CRACKING & SPALLING

STOPGATES - SATISFACTORY ALL ARE REMOVABLE EITHER BY LIFTING MECHANISMS OR BY CRANE

c. Emergency or Auxiliary Spillway NONE

d. Condition of Discharge Conveyance Channel SATISFACTORY

MINOR CONCRETE DETERIORATION - ROUNDED CORNERS

e. Stability of Channel side/slopes SATISFACTORY

7) Downstream Channel

WETLAND WITHIN 300' OF TOE OF EMBANKMENT ; THEN NATURAL CHANNEL (HEMLOCK OUTLET) TO HEMLOCK VILLAGE

a. Condition (debris, etc.) STEEL SHEET PILE RETAINING WALL IMMEDIATELY ADJACENT & DOWNSTREAM OF BRIDGE - CORRODED & PERFORATED @ WATERLINE REMAINDER - NATURAL CHANNEL

b. Slopes NA

c. Approximate number of homes VILLAGE OF HEMLOCK

8) Reservoir Drain/Outlet

Type: Pipe _____ Conduit _____ Other NONE

Material: Concrete _____ Metal _____ Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (describe): Unobservable _____

Material: _____

Joints: _____ Alignment: _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (describe): _____

9) Structural

a. Concrete Surfaces MINOR SURFACE SPALLING & DETERIORATION ON PIER NOSES, SPILLWAY FOOTBRIDGE

b. Structural Cracking - @ UPSTREAM CORNER OF EAST WINGWALL; SOME ON FOOTBRIDGE

c. Movement - Horizontal & Vertical Alignment (Settlement) NONE

d. Junctions with Abutments or Embankments SATISFACTORY

e. Drains - Foundation, Joint, Face NA

f. Water passages, conduits, sluices STOPLOGS - SATISFACTORY

g. Seepage or Leakage NONE

h. Joints - Construction, etc. SATISFACTORY

CONCRETE SLABS - BITUMINOUS FILLER MATERIAL LACKING @ SOME JOINTS

i. Foundation

j. Abutments

k. Control Gates OPERATIONAL (2 END STOPGATES); 6 INTERIOR STOPGATES REQUIRE REMOVAL USING A MOBILE CRANE

l. Approach & Outlet Channels SATISFACTORY

m. Energy Dissipators (plunge pool, etc.) NONE

n. Intake Structures

o. Stability

p. Miscellaneous

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
TOP OF CONC. ABUTS.	910.3		42 113
1) Top of Dam	909.8		41101
2) Design High Water (Max. Design Pool)			
3) Auxiliary Spillway Crest	NONE		
4) Pool Level with [redacted] STOPGATES 4-EXTERIOR	904.7		
4-INTERIOR	903.9		
5) Service Spillway Crest	900.8	2054	22356

[DATUM: 1935 PLANS + 507.27 = USGS ELEVATIONS]

DISCHARGES

	Volume (cfs)
1) Average Daily	NA
2) Spillway @ [redacted] BOTH END STOPGATES OPERATING	10,799
3) Spillway @ [redacted] ONE END STOPGATE	6,896
4) Spillway @ [redacted] STOPGATES CLOSED	2,992
5) Low Level Outlet (MAX. WATER SUPPLY - GRAVITY WITHDRAWAL / PUMPED WITHDRAWAL)	72.7 / 46.7
6) Total (of all facilities) @ Maximum High Water	NA
7) Maximum Known Flood	UNKNOWN
8) At Time of Inspection	NONE

CREST: ELEVATION: 909.8

Type: INCLUDED EARTH EMBANKMENT

Width: 20' Length: 3200'

Spillover CONCRETE OGEE SPILLWAY (8 BAYS) WITH STOPGATES

Location NEAR WEST END OF EMBANKMENT

SPILLWAY:

PRINCIPAL		EMERGENCY
900.8	Elevation	
CONCRETE OGEE-SHAPED	Type	NONE
8' WIDE x 8 BAYS = 64' (NET)	Width	
	Type of Control	
	Uncontrolled	
2 EXTERIOR - IN PLACE MECHANICAL GATES LIFTING MACHINERY	Controlled:	
STOPGATES	Type (Flashboards; gate)	
4 INTERIOR BAYS - 4 HIGH 4 EXTERIOR " - 5 HIGH	Number	
8'+ WIDE x 9" HIGH CHANNELS WELDED TO ACT AS A UNIT	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
NA	Chute Length	
2.5'	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

HYDROMETEROLOGICAL GAGES:

Type : NONE ; DAILY WATER SURFACE LEVELS RECORDED @ WATER TREATMENT PLANT (EAST END OF EMBANKMENT)

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE APPARENT

_____

Method of Controlled Releases (mechanisms):

OPERATION OF THE SLUICEGATES

GRAVITY WITHDRAWAL THRU THE WATER SUPPLY INTAKE

DRAINAGE AREA: 43.13 SQ MILES

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: FORESTED ; CITY-CONTROLLED BUFFER STRIP AROUND LAKE / LIGHTLY POPULATED IN REMAINDER OF WATERSHED

Terrain - Relief: STEEP

Surface - Soil: ERODIBLE

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

DEVELOPMENT - HINDERED BY CITY-OWNED LANDS

Potential Sedimentation problem areas (natural or man-made; present or future)

NA

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

NONE

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NONE

Elevation: _____

Reservoir:

Length [redacted] 7.2 (Miles)

Length of Shoreline (@ [redacted] ELEV. 905 17.1 (Miles)

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB				SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM				1/		
SUBJECT					COMPUTED BY	DATE
					WCL	7/17/79
DRAINAGE AREA: USGS 7.5' QUAD				SCALE: 1" = 2000'		
				1 SQ IN = 91.827 ACRES		
				PLANIMETER CALIBRATION: 1.92 IN = 2.0		
QUAD NAME			AREA	ACTUAL		
SPRINGWATER	DIVERSION STRUCTURE DR. AREA		4.49			
HONEOYE			16.21			
	TOTAL:		20.69	34.48 →	31616.2 ACRES	
					4.95 SQ MILES	
HONEOYE	HEMLOCK LAKE SURFACE AREA - 905 CONTOUR - 920		3.60	@ 905		
				22.37 →	2054.9 ACRES (3.21 SQ MILES)	
HONEOYE			4.05	@ 920		
				30.09 →	2762.2 ACRES (4.32 SQ MILES)	
SPRINGWATER	AREA - 905		2.82			
	CONTOUR - 920		14.00			
					LONGEST DRAINAGE PATH TO DAM L = 95450'	
HONEOYE	DRAINAGE AREA @ HEMLOCK LAKE DAM		9.69		16.18 MILES	←
SPRINGWATER			46.99			
			58.49			
WAYLAND			37.05			
DANSVILLE			1.45			
			0.46			
CONESUS			6.60			
			10.33			
LIVONIA			9.28	300.57 →	27600.4 ACRES	
					43.13 SQ MILES	←
	TOTAL:		180.34			

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PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	2/		
SUBJECT		**COMPUTED BY**	**DATE**
HYDROGRAPH PARAMETERS		WCL	7/18/79

DR. AREA = 48.13 SQ MILES L = 95450' (18.18 MILES) L_{CA} = 38500' (7.29 MILES) C_t = 1.2

LAG TIME: $t_p = C_t (L \cdot L_{CA})^{0.5}$

t_p = 8.37 HRS

UNIT RAIN DURATION: $t_r = \frac{t_p}{5.5}$

t_p = 1.52 HRS (USE t_R = 1.5 HR) ←

ADJUSTED LAG TIME:

$TP = t_p + 0.25(t_R - t_r)$

TP = 8.37 HRS C_p = 0.625 ←

TRANSPOSITION FACTOR: $TRSPC = 1 - \frac{0.3008}{(DA)^{.1771}}$

TRSPC = 0.85 ←

LOSS RATES (SOIL):

SOIL CLASSIFICATION – YONUSIA (SCS - C) INITAL = 1.0 ←
CONSTANT = 0.1

BATH (SCS - C)

BASE FLOW: 2 cfs/SQ MILE USE 4.6 cfs ←

PRECIPITATION: PMP

	200 SQ MI/24 HR	6	12	24	48
ZONE 1	21.5"	94	107	118	125
SITE	21.5"	97	108	120	128 ←
ZONE 2	21.5"	99	109	121	131

HEMLOCK LAKE DAM
NY-477
FIELD MEASUREMENTS - 6/79

STOPGATE = 4 OR 5 9" HIGH CHANNELS WELDED WITH 2" WOOD SEAT @ SPILLWAY CREST

To HEMLOCK LAKE DAM
NY-477

From SANDY VREELAND
WATER SUPERINTENDENT - ROCHESTER

Subject STOP GATES @ SPILLWAY ELEV. - DATUM Date FROM EOM 8/16/79

Message

1) STOP GATES ARE WELDED TOGETHER ; CONSIDER EACH AS ONE UNIT

2) EXISTING IN-PLACE GEAR HOIST(S) ON EACH END OF THE SPILLWAY CAN LIFT THE GATE SILL TO THE UNDERSIDE OF THE SLAB ELEVATION

3) THE 4 INTERIOR STOP GATES MUST BE REMOVED USING A MOBILE CRANE PLACED ON THE EARTH EMBANKMENT (@ CREST OR TOE)

4) 1935 SET OF DRAWINGS :
GIVEN ELEVATIONS + 5C&35 EQUAL ELEVATIONS (7/27/79 LETTER)
5C&35 REFERENCED TO BARGE CANAL @ ROCHESTER DATUM

SIGNED WCL

Reply - NONE DATE

SIGNED

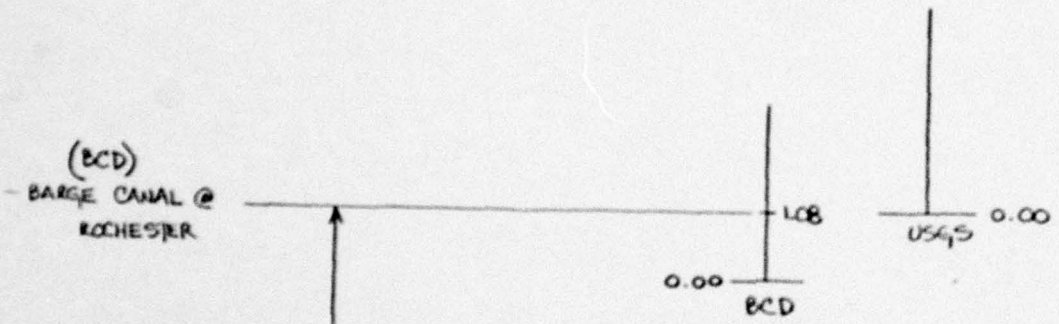
47-213
Made in U.S.A.

THIS COPY FOR PERSON ADDRESSED

[ROCHESTER AREA]

HEMLOCK LAKE DAM
NY-477

DATUM (ELEVATION) CONVERSION



0.00 (USGS) = 1.08 (BCD)

		(+508.35) BCD	(-1.08) USGS
SPILLWAY CREST	PLAN 393.50	901.85	900.77
		(+507.27)	
TOP OF WALKWAY BRIDGE	403.0		910.3

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	3/		
SUBJECT	COR = CITY OF ROCHESTER	**COMPUTED BY**	**DATE**
STAGE - AREA - CAPACITY DATA		WCL	8/16/79

EXISTING DATA:

	DESCRIP.	STAGE (COR)	MALCOLM PIRNIE (5/1977)		AC-FT (TOTAL)	(COR) X 10⁶ FT³ (TOTAL)	STORAGE GALS. (PIRNIE)	AC-FT
60" PIPE	WATER SUPPLY OUTFLOW - INVERT	887.3	887.3			—		
				18.5'			11 x 10⁹	33770
		11.5'			14983	602		
U/S	BASE - CREST	898.8						
		3'			22356	372		
	SPILLWAY CREST	901.8	905.8					
		8.5'			41101	1787		
	TOP - DAM EARTH	910.3						
		0.5'			42113	1831		
	TOP - CONC. ABUTS. @ SPILLWAY	910.8						

1935 DRAWINGS: DATUM IS NOT USGS DO NOT USE PLAN ELEVATIONS ←
1937

FOR ANALYSIS:
SPILLWAY CREST = 900.8

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PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	4/		
SUBJECT		**COMPUTED BY**	**DATE**
STORAGE CAPACITY		WCL	8/16/79

USE CITY OF ROCHESTER - DATA: DIRECT CONVERSION - ELEVATIONS

1935 DWGS + 507.3 = STAGE

DESCRIP.	STAGE	ΔH	ΔV	VOL (AC-FT)	
(5/77 PRIME W.)	887.3			—	
U/S EDGE OF CREST	898.3			14285	
SPILLWAY CREST	900.8			22356	—
		3.15'	6561		
(INTERIOR 4	903.95			28917	
TOP STOP GATES -8		0.75'	1562		
(EXTERIOR 4	904.7			30479	
TOP EARTH EMB.	909.8			41101	—
	(-0.5')				
TOP CONC. ABUTS & WALKWAY BRIDGE	910.3			42113	

3080 AC-FT

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PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	5/		
SUBJECT		**COMPUTED BY**	**DATE**
DISCHARGE CAPACITIES		WCL	8/16/79

EXISTING SPILLWAY + VERTICAL GATE (1 - EACH END) IS OPERATIONAL ←

WIDTH = 9' ea NO END CONTRACTIONS

ORIFICE - SUBMERGED FLOW

$Q = CA\sqrt{2gH}$

A - VARIES WITH H

C - VARIES " H

$Q = 8.025\,CA\sqrt{H}$

[DESIGN OF SMALL DAMS - USBR 2ND ED. FIG 249]

OGEE-SHAPED CREST:

$P/H_a = 0.294$

(MAX) $H_a = 8.5'$

$C = 3.67$

P = 2.5'

STAGE	H	P/H (FIG 249)	C	A	ORIFICE CENTER H	Q	Q (BOTH GATES)
SPILLWAY CREST 900.8	—				—	—	—
901	0.2	12.5	3.95	1.6	0.1	16	32
902	1.2	2.08	3.34	9.6	0.6	235	470
903	2.2	1.14	3.90	17.6	1.1	578	1156
TOP INTER. GATES 903.95	3.15	0.79	3.86	25.2	1.58	981	1962
904	3.2	0.78	3.86	25.6	1.6	1003	2006
TOP ADJACENT GATES 904.7	3.9	0.64	3.84	31.2	1.95	1343	2686
905	4.2	0.6	3.82	33.6	2.1	1493	2986
906	5.2	0.48	3.79	41.6	2.6	2040	4080
907	6.2	0.4	3.76	49.6	3.1	2635	5270
908	7.2	0.35	3.73	57.6	3.6	3071	6142
909	8.2	0.3	3.68	65.6	4.1	3923	7846
SLAB UNDERSIDE 909.3	8.5	0.294	3.67	68 — SLAB	4.25	4129	8258
TOP SLAB 910.3	9.5	0.263	3.65	68 — SLAB	4.75	4341	8682

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	6/		
SUBJECT		**COMPUTED BY**	**DATE**
DISCHARGE CAPACITIES		WCL	8/17/79

EXISTING RAILWAY - ALL STOP GATES REMOVED

$Q = CLH^{3/2}$ 8 OPENINGS @ 8' WIDE EACH = 64'

ENDS OF ABUTMENTS - ROUNDED $K_a = 0$

7 POINTED-NOSED PIERS $K_p = 0$

$L = L' - 2(NK_p + K_a)H$ $N = 7$

$L = 64'$

$L = 64'$

C - VARIES WITH H [SEE SHT 5/ - OGEE SHAPED CREST (FIG. 249 P/H vs C)

STAGE	H	C	Q
900.8	—		—
901	0.2	3.95	22.6
902	1.2	3.94	331
903	2.2	3.9	914
904	3.2	3.86	1414
905	4.2	3.82	2104
906	5.2	3.79	2876
907	6.2	3.76	3715
908	7.2	3.73	4612
909	8.2	3.68	5530
909.3 SLAB	8.5	3.67	5801
910.3	9.5	3.65	6840

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PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	7/		
SUBJECT		COMPUTED BY	DATE
DISCHARGE CAPACITIES		WCL	8/17/79

EXISTING SPILLWAY WITH STOPLOGS IN PLACE (SEE 6/79 FIELD MEASUREMENTS)

SHARP CRESTED WEIR - NO SIDE CONTRACTIONS

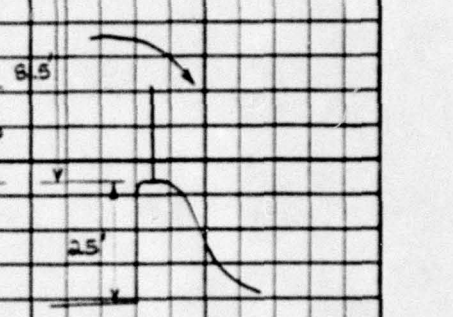
REF: HANDBOOK OF HYDRAULICS
KING & BRATER 5TH ED.
(EQN 5-23) (APPROACH VEL. < 5 fps)

$C = 3.33\left(1 + 0.259\frac{H}{d}^{2}\right)$ $d = P + H$

$Q = CLH^{3/2}$

$L = 8'$

C - VARIES WITH H



STAGE	303.95 4 - INTERIOR P = 3.15' H	d	C	Q	4Q	304.7 4 - EXTERIOR P = 3.9' H	d	C	Q	4Q	TOTAL S-GATES
303.95	—			—	—	—					—
304	0.05	3.2	3.33	3	12	—					12
304.7	0.75	3.9	3.36	17.5	70	—			—	—	70
305	1.05	4.2	3.38	29.1	116	0.3	4.2	3.33	4.4	18	134
306	2.05	5.2	3.46	81.2	325	1.3	5.2	3.38	40.1	160	485
307	3.05	6.2	3.54	151	604	2.3	6.2	3.45	96.3	385	989
308	4.05	7.2	3.60	235	940	3.3	7.2	3.51	168	672	1612
309	5.05	8.2	3.66	332	1328	4.3	8.2	3.57	255	1020	2348
309.3 — SLAB —	5.35	8.5	3.67	363	1452	4.6	8.5	3.58	283	1132	2584
310.3	6.35	9.5	▼	470	1880	5.6	9.5	▼	380	1520	3400

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PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	8/		
SUBJECT		COMPUTED BY	DATE
DISCHARGE CAPACITIES		WCL	8/17/79

EXISTING SPILLWAY - END STOPGATES OPERATIONAL
6 OR 7 - INTERIOR STOPGATES IN-PLACE (6/79 FIELD CONDITIONS)

STAGE	ONE END GATE (SHT 5)	BOTH END GATES (SHT 5)	ADJACENT GATES 2	ADJACENT GATES 3	INTERIOR 4 GATES	TOTAL Q w/ 1-END GATE	TOTAL Q w/ BOTH END GATES
900.8	—	—	—	—	—	—	—
901	16	32				16	32
902	235	470				235	470
903	578	1156				578	1156
903.95	981	1962			—	981	1962
904	1003	2006			12	1015	2018
904.7	1343	2686	—	—	70	1413	2756
905	1493	2986	9	13	116	1622	3111
906	2040	4080	80	120	325	2485	4485
907	2635	5270	192	289	604	3528	6066
908	3271	6542	336	504	940	4715	7818
909	3923	7846	510	765	1328	6016	9684
909.3	4129	8258	566	849	1452	6430	10276
SLAB							
910.3	4341	8682	760	1140	1880	7361	11322

City of Rochester

Bureau of Water
Department of
Environmental Services

10 Felix Street
Rochester, New York 14608

July 27, 1979

RE: Hemlock Lake Dam NY-477
Canadice Lake Dam NY-443

This is in response to your letter of June 20, 1979 to Mr. Gassman requesting information on the subject dams. The responses are identified in the order of the items requested:

A 1) Drainage areas
Hemlock Lake 48.0 sq. mi.
Canadice Lake 12.6 sq. mi.

2) NOTE: For the specific elevations listed we are only able to provide storage capacities. We have no table which lists surface areas at various elevations.

Refer to enclosed pages 12, 13, and 14 of May 1977 Comprehensive Water Supply Study by Malcolm Pirnie, Inc. for the description of streams entering the lakes.

	Hemlock Lake		ELEVATION	STORAGE
a)	Pipe invert-water supply outflow	—	887.3	0
b)	Base of spillway upstream side	(898.3)	898.8	621 MCF
c)	Spillway Crest	(900.8)	901.8	972 MCF
d)	Top of concrete abutments at spillway	(910.8)	910.8	1831 MCF
e)	Top of earth embankment	(909.8)	910.3	1787 MCF

Canadice Lake	ELEVATION	STORAGE
a) Pipe invert-water supply outflow		0
b) Base of spillway upstream side	1089.5	189 MCF
c) Spillway crest	1096.0	400 MCF
d) Top of concrete abutments at spillway	1101.5	584 MCF
e) Top of earth embankment	1101.54	584 MCF

3) MAX. KNOWN ELEVATION — DATE — SPILLWAY DISCHARGE

HEMLOCK 906+	6-23-72	UNKNOWN
CANADICE 1100+	6-23-72	478×10^3 cu ft/day

4)

	LENGTH
HEMLOCK	38,000'±
CANADICE	17,000'±

5) Length of shoreline (data available only for elevation indicated as determined by N.Y.S. Department of Health).

HEMLOCK	905.0'	17.10 mi.
CANADICE	1096.0'	7.10 mi.

Surface areas of lakes (obtained from N.Y.S. Dept. of Health).

HEMLOCK	3.594 sq. mi.
CANADICE	338.0×10^4 m^2

6) History

HEMLOCK

Original dam built by the City in early 1870's, rebuilt in 1908 and 1926, present Spillway constructed 1935.

CANADICE

Original dam at end of lake built around 1910, present Spillway built in 1936 several hundred feet west of original dam.

7) Consulting Engineers' Reports (see enclosed copies). Pages 4-7 of the Malcolm Pirnie - January 1979 Upland Water Supply Study are enclosed for your use.

B) HEMLOCK LAKE DAM

1. WATER DIVERSION CONDUIT FROM CANADICE

60" CONCRETE Conduit constructed 1912, 3800' long maximum possible flow (assuming coefficient of 7) 104.7 MGD.

2. Water supply conduits at Hemlock

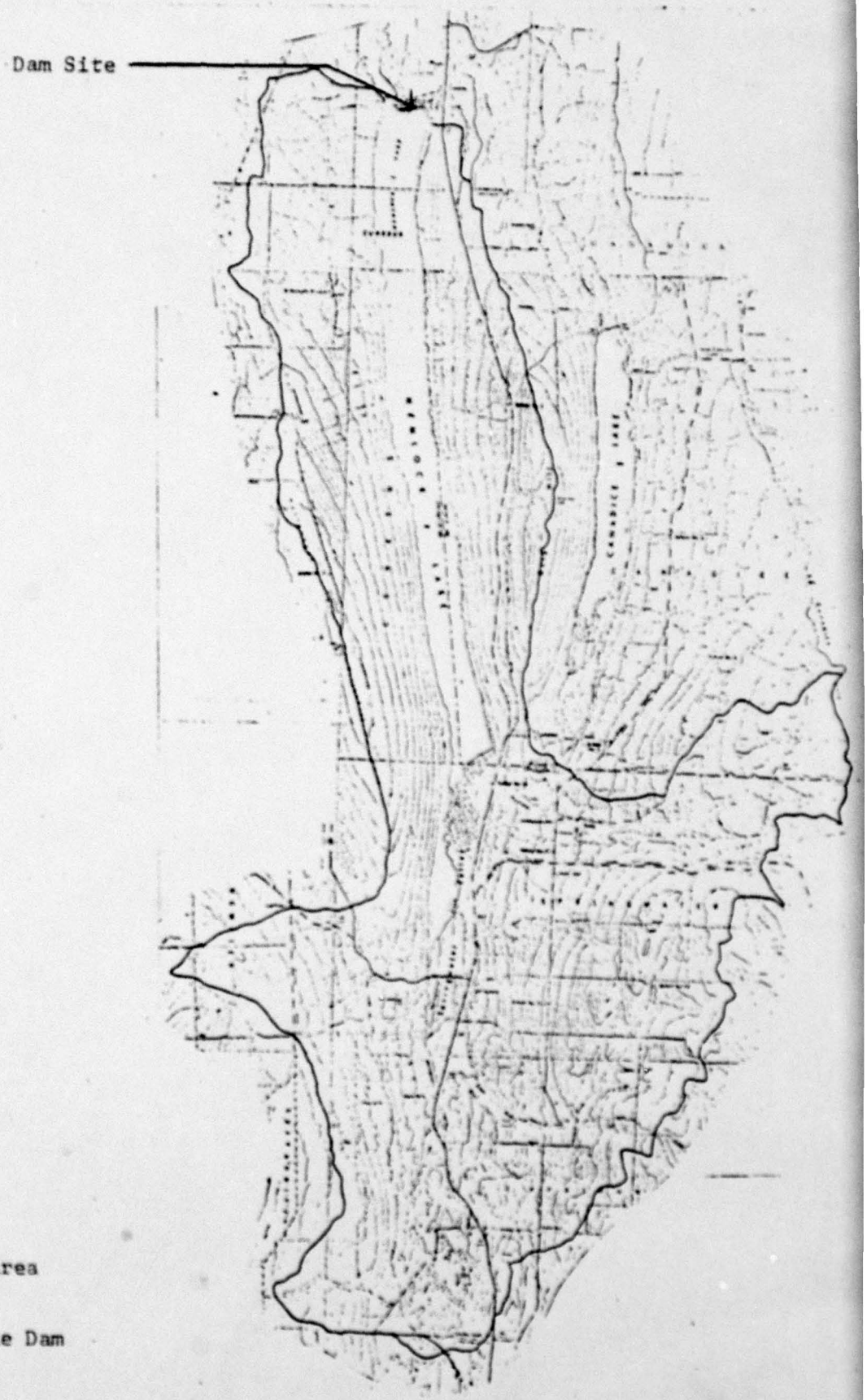
a) 6' brick tunnel 12,200' long
b) 36" cast iron conduit 13,600 long avg. daily outflow 37 MGD.

MAXIMUM POSSIBLE OUTPUT 47 MGD (GRAVITY FLOW) when lake level drops below 887.3 maximum pumped output is 30.2 MGD.

C) CANADICE LAKE DAM

1. MAXIMUM DISCHARGE RATE 11.730 MCF/day 4-4-73
AVG. DAILY DISCHARGE (1978) 1.069 MCF.

2. MAXIMUM PUMPING RATE POSSIBLE THROUGH 24" BYPASS PIPE 15 MGD.



Drainage Area

Hemlock Lake Dam

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***************************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION        JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL [illegible] 79
***************************************

***************************************
THIS PROGRAM IS CURRENTLY BEING MODIFIED
TO RUN ON THE USGS HONEYWELL SYSTEM

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
TO MIKE TILLSHY [illegible] 5233 [illegible] 7-5626
***************************************
  1          A HEMLOCK LAKE DAM      NY-477                               GENESEE RIVER BASIN
  2          A                       CITY OF ROCHESTER                   LIVINGSTON-ONTARIO COUNTY
  3          A                       WATER SUPPLY                         PMF - SNYDER UH
  4          B     100        1       30      0      0      0      0      0      0      0
  5          B1      5
  6          J       1        2        1
  7          J1    0.5        1
  8          K       0        1                                           1
  9          K1                      INFLOW HYDROGRAPH
 10          M       1        1    43.13          43.13   0.85                        1
 11          P             21.5       97    104     120    126
 12          T                                                  1.0    0.1
 13          W    8.37    0.625
 14          X      45       46        1
 15          K       1        1                                           1
 16          K1                      ROUTED HYDROGRAPH AT DAM - NO BREACH  GATES-CLOSED (6/79
 17          Y                               1       1
 18          Y1      5                                       -903.9     -1
 19          Y4  903.9      904    904.7    905     906    907    908    909  909.3  910.3
 20          Y5      0       12       73    134     485    989   1512   2348   2584   3400
 21          $S  28917    41121    42113
 22          $E  903.9    909.3    910.3
 23          $$  903.9
 24          $D  909.3    3.037      1.5   3200
 25          K      99
 26          A
 27          A
```

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**************************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**************************************

******************************************
THIS PROGRAM IS CURRENTLY BEING MODIFIED
TO RUN ON THE OGS HONEYWELL SYSTEM

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
TO MIKE TILLSON (RT. 423) PH: 7-5664
******************************************

RUN  DATE 08/20/79
          HEMLOCK LAKE DAM      NY-477                          GENESEE RIVER BASIN
                                CITY OF ROCHESTER               LIVINGSTON-ONTARIO COUNTY
                                WATER SUPPLY                    PMF - SNYDER UH

                                       JOB SPECIFICATION
           NQ     NHR    NMIN    IDAY     IHR    IMIN   METRC     IPLT    IPRT   NSTAN
          100       1      30       0       0       0       0        0       0       0
                                JOPER     NWT   LROPT   TRACE
                                    5       0       0       0

                               MULTI-PLAN ANALYSES TO BE PERFORMED
                                 NPLAN= 1 NRTIO= 2 LRTIO= 1
            RTIOS=   0.50   1.00


       **********     **********     **********     **********     **********

                                 SUB-AREA RUNOFF COMPUTATION

                                INFLOW HYDROGRAPH
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             1       0       0       0       0       0       1       0       0

                                       HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1       1   43.13      0.   43.13    0.85      0.       0       1       0

                                        PRECIP DATA
                      SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.   21.50   97.00  108.00  120.00  128.00      0.      0.

                                         LOSS DATA
       LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
           0      0.      0.    1.00      0.      0.    1.00    1.00    0.10      0.      0.

                                     UNIT HYDROGRAPH DATA
                               TP=  8.37     CP=0.63     NTA=  0

                                       RECESSION DATA
                         STRTQ=    46.00     QRCSN=    46.00     RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 6.45 AND R= 5.16 INTERVALS
     EXP UNDERFLO  AT LOCATION      230256
     EXP UNDERFLO  AT LOCATION      230256
```

[illegible]	741.	[illegible]	51[illegible].	425.	351.	288.	237.	195.	161.
132.	107.	91.	74.	61.	51.	41.	34.	28.	23.
19.									

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	1.30	1	0.01	0.	0.01	46.	1.04	4.30	51	0.	0.	0.	1034.
1.01	3.00	2	0.01	0.	0.01	46.	1.04	6.00	52	0.	0.	0.	854.
1.01	4.30	3	0.01	0.	0.01	46.	1.04	7.30	53	0.	0.	0.	705.
1.01	6.00	4	0.01	0.	0.01	46.	1.04	9.00	54	0.	0.	0.	583.
1.01	7.30	5	0.03	0.	0.03	46.	1.04	10.30	55	0.	0.	0.	483.
1.01	9.00	6	0.03	0.	0.03	46.	1.04	12.00	56	0.	0.	0.	336.
1.01	10.30	7	0.03	0.	0.03	46.	1.04	13.30	57	0.	0.	0.	141.
1.01	12.00	8	0.03	0.	0.03	46.	1.04	15.00	58	0.	0.	0.	69.
1.01	13.30	9	0.31	0.	0.31	46.	1.04	16.30	59	0.	0.	0.	65.
1.01	15.00	10	0.63	0.10	0.53	60.	1.04	18.00	60	0.	0.	0.	58.
1.01	16.30	11	0.25	0.10	0.15	104.	1.04	19.30	61	0.	0.	0.	53.
1.01	18.00	12	0.00	0.00	0.	195.	1.04	21.00	62	0.	0.	0.	49.
1.01	19.30	13	0.02	0.	0.02	293.	1.04	22.30	63	0.	0.	0.	46.
1.01	21.00	14	0.02	0.	0.02	341.	1.05	0.	64	0.	0.	0.	46.
1.01	22.30	15	0.02	0.	0.02	434.	1.05	1.30	65	0.	0.	0.	46.
1.02	0.	16	0.02	0.	0.02	414.	1.05	3.00	66	0.	0.	0.	46.
1.02	1.30	17	0.22	0.07	0.15	407.	1.05	4.30	67	0.	0.	0.	46.
1.02	3.00	18	0.22	0.07	0.15	315.	1.05	6.00	68	0.	0.	0.	46.
1.02	4.30	19	0.22	0.07	0.15	404.	1.05	7.30	69	0.	0.	0.	46.
1.02	6.00	20	0.22	0.07	0.15	468.	1.05	9.00	70	0.	0.	0.	46.
1.02	7.30	21	0.50	0.35	0.15	606.	1.05	10.30	71	0.	0.	0.	46.
1.02	9.00	22	0.50	0.35	0.15	867.	1.05	12.00	72	0.	0.	0.	46.
1.02	10.30	23	0.50	0.35	0.15	1268.	1.05	13.30	73	0.	0.	0.	46.
1.02	12.00	24	0.50	0.35	0.15	1798.	1.05	15.00	74	0.	0.	0.	46.
1.02	13.30	25	4.61	4.46	0.15	3002.	1.05	16.30	75	0.	0.	0.	46.
1.02	15.00	26	9.40	9.25	0.15	6457.	1.05	18.00	76	0.	0.	0.	46.
1.02	16.30	27	3.72	3.57	0.15	12924.	1.05	19.30	77	0.	0.	0.	46.
1.02	18.00	28	0.00	0.00	0.	21186.	1.05	21.00	78	0.	0.	0.	46.
1.02	19.30	29	0.33	0.18	0.15	29241.	1.05	22.30	79	0.	0.	0.	46.
1.02	21.00	30	0.33	0.18	0.15	35055.	1.06	0.	80	0.	0.	0.	46.
1.02	22.30	31	0.33	0.18	0.15	37157.	1.06	1.30	81	0.	0.	0.	46.
1.03	0.	32	0.33	0.18	0.15	35177.	1.06	3.00	82	0.	0.	0.	46.
1.03	1.30	33	0.	0.	0.	30659.	1.06	4.30	83	0.	0.	0.	46.
1.03	3.00	34	0.	0.	0.	25339.	1.06	6.00	84	0.	0.	0.	46.
1.03	4.30	35	0.	0.	0.	21657.	1.06	7.30	85	0.	0.	0.	46.
1.03	6.00	36	0.	0.	0.	18097.	1.06	9.00	86	0.	0.	0.	46.
1.03	7.30	37	0.	0.	0.	15049.	1.06	10.30	87	0.	0.	0.	46.
1.03	9.00	38	0.	0.	0.	12450.	1.06	12.00	88	0.	0.	0.	46.
1.03	10.30	39	0.	0.	0.	10266.	1.06	13.30	89	0.	0.	0.	46.
1.03	12.00	40	0.	0.	0.	8460.	1.06	15.00	90	0.	0.	0.	46.
1.03	13.30	41	0.	0.	0.	6972.	1.06	16.30	91	0.	0.	0.	46.
1.03	15.00	42	0.	0.	0.	5747.	1.06	18.00	92	0.	0.	0.	46.
1.03	16.30	43	0.	0.	0.	4739.	1.06	19.30	93	0.	0.	0.	46.
1.03	18.00	44	0.	0.	0.	3910.	1.06	21.00	94	0.	0.	0.	46.
1.03	19.30	45	0.	0.	0.	3227.	1.06	22.30	95	0.	0.	0.	46.
1.03	21.00	46	0.	0.	0.	2665.	1.07	0.	96	0.	0.	0.	46.
1.03	22.30	47	0.	0.	0.	2203.	1.07	1.30	97	0.	0.	0.	46.
1.04	0.	48	0.	0.	0.	1820.	1.07	3.00	98	0.	0.	0.	46.
1.04	1.30	49	0.	0.	0.	1500.	1.07	4.30	99	0.	0.	0.	46.
1.04	3.00	50	0.	0.	0.	1247.	1.07	6.00	100	0.	0.	0.	46.

	RAIN	EXCS	LOSS	COMP Q
SUM	23.39	19.87	3.52	371428.
	(594.)	(505.)	(89.)	(10517.67)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	37157.	34318.	20394.	7667.	371384.
CMS	1052.	972.	577.	216.	10516.
INCHES		7.41	17.59	19.90	20.03
MM		188.11	446.87	505.34	508.56

	THOUS CU M			21002.	49895.	56421.		56789.		

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

23.	23.	23.	23.	23.	23.	23.	23.	23.	30.
55.	97.	147.	191.	217.	215.	203.	192.	202.	234.
303.	434.	634.	899.	1501.	3228.	6462.	10593.	14621.	17933.
18579.	17554.	15330.	12918.	10829.	904.	7524.	6225.	5133.	4230.
3489.	2870.	2370.	1955.	1614.	1333.	1101.	910.	753.	623.
517.	427.	353.	292.	241.	199.	70.	34.	32.	29.
27.	25.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.
23.	23.	23.	23.	23.	23.	23.	23.	23.	23.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	18579.	17149.	10197.	3844.	105692.
CMS	526.	486.	289.	109.	5253.
INCHES		3.70	8.80	9.95	10.01
MM		94.06	223.45	252.67	254.32
AC-FT		9313.	20225.	22871.	23020.
THOUS CU M		10591.	24948.	28210.	28394.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

46.	46.	46.	46.	46.	46.	46.	46.	46.	60.
109.	195.	293.	381.	434.	434.	407.	385.	404.	466.
606.	867.	1268.	1798.	3002.	6457.	12924.	21186.	29241.	35066.
37157.	35177.	30659.	25839.	21657.	18097.	15049.	12459.	10266.	8460.
6772.	5747.	4739.	3910.	3227.	2665.	2203.	1820.	1506.	1247.
1034.	854.	705.	583.	483.	335.	141.	69.	65.	58.
53.	49.	46.	46.	46.	46.	46.	46.	46.	46.
46.	46.	46.	46.	46.	46.	46.	46.	46.	46.
46.	46.	46.	46.	46.	46.	46.	46.	46.	46.
46.	46.	46.	46.	46.	46.	46.	46.	46.	46.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	37157.	34318.	20394.	7687.	371384.
CMS	1052.	972.	577.	218.	10516.
INCHES		7.41	17.59	19.90	20.03
MM		188.11	446.59	505.34	508.64
AC-FT		18637.	40451.	45741.	46039.
THOUS CU M		21002.	49895.	56421.	56789.

HYDROGRAPH ROUTING

ROUTED HYDROGRAPH AT DAM - NO BREACH GATES-CLOSED (6/79

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
5	0	0	0.	0.	0.	904.	-1

STAGE	903.90	904.00	904.70	905.00	906.00	907.00	908.00	909.00	909.30	910.30
FLOW	0.	12.00	70.00	134.00	485.00	989.00	1612.00	2348.00	2584.00	3400.00

ELEVATION= 904. 910. 914.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
903.9	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COQD	EXPD	DAMWID
909.8	3.1	1.5	3200.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	1.	1.	1.	1.	1.	1.	2.
2.	2.	3.	4.	6.	7.	9.	10.	12.	13.
14.	16.	18.	22.	28.	39.	63.	174.	437.	882.
1488.	2183.	2940.	5593.	9048.	9556.	8634.	7752.	6668.	5690.
4867.	4179.	3524.	3202.	2979.	2907.	2826.	2739.	2643.	2555.
2494.	2372.	2285.	2200.	2118.	2034.	1951.	1869.	1789.	1713.
1641.	1577.	1520.	1465.	1412.	1361.	1312.	1265.	1219.	1175.
1133.	1092.	1053.	1015.	981.	952.	924.	897.	871.	846.
822.	799.	773.	752.	731.	709.	689.	669.	650.	631.
613.	596.	571.	562.	546.	530.	515.	500.	486.	476.

STORAGE

28920.	28923.	28925.	28928.	28931.	28934.	28936.	28939.	28942.	28945.
28950.	28959.	28974.	28994.	29019.	29045.	29070.	29094.	29117.	29142.
29174.	29219.	29282.	29374.	29520.	29809.	30403.	31445.	32970.	34881.
36973.	38737.	40715.	41926.	42471.	42550.	42436.	42262.	42072.	41886.
41710.	41543.	41383.	41230.	41085.	40945.	40811.	40681.	40558.	39993.
39752.	39511.	39271.	39033.	38799.	38567.	38335.	38104.	37882.	37669.
37456.	37244.	37033.	36827.	36721.	36552.	36389.	36232.	36081.	35936.
35795.	35658.	35530.	35405.	35284.	35167.	35054.	34944.	34837.	34733.
34633.	34535.	34441.	34349.	34260.	34173.	34090.	34008.	33929.	33853.
33779.	33709.	33637.	33569.	33503.	33439.	33377.	33317.	33259.	33202.

STAGE

903.9	903.9	903.9	903.9	903.9	903.9	903.9	903.9	903.9	903.9
903.9	903.9	903.9	903.9	903.9	904.0	904.0	904.0	904.0	904.0
904.0	904.0	904.1	904.1	904.2	904.3	904.6	905.1	905.9	906.8
907.8	908.5	909.0	910.2	910.5	910.5	910.5	910.4	910.3	910.2
910.1	910.0	909.9	909.9	909.8	909.7	909.6	909.5	909.4	909.3
909.1	909.0	908.9	908.8	908.7	908.6	908.5	908.3	908.2	908.1
908.0	907.9	907.9	907.8	907.7	907.6	907.5	907.4	907.4	907.3
907.2	907.2	907.1	907.0	907.0	906.9	906.9	906.8	906.8	906.7
906.7	906.6	906.6	906.5	906.5	906.4	906.4	906.4	906.3	906.3
906.3	906.2	906.2	906.2	906.1	906.1	906.1	906.0	906.0	906.0

PEAK OUTFLOW IS 9556. AT TIME 54.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	9556.	8566.	5220.	2818.	191150.
CMS	271.	243.	148.	80.	4280.
INCHES		1.85	4.50	7.29	8.15
MM		46.93	114.34	185.26	207.02
AC-FT		4247.	10353.	16768.	18739.
THOUS CU M		5239.	12771.	20683.	23113.

STATION 1, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

0.	1.	1.	1.	2.	2.	2.	3.	3.	3.
4.	5.	7.	8.	12.	14.	16.	18.	20.	22.
24.	21.	33.	41.	52.	44.	252.	653.	1477.	2616.
19077.	31980.	32723.	29105.	25007.	21211.	17913.	15079.	12062.	10629.
6925.	7514.	6345.	5382.	4592.	3951.	3440.	3082.	2753.	2877.
2794.	2705.	2614.	2522.	2430.	2338.	2247.	2154.	2064.	1970.
1895.	1815.	1737.	1665.	1594.	1541.	1486.	1433.	1382.	1333.
1290.	1243.	1157.	1154.	1114.	1074.	1037.	1000.	970.	942.
915.	874.	864.	840.	819.	793.	771.	750.	729.	708.
684.	659.	651.	633.	615.	594.	582.	569.	550.	555.

STORAGE

28923.	28928.	28934.	28939.	28945.	28950.	28956.	28961.	28967.	28973.
28954.	29001.	29031.	29072.	29121.	29173.	29224.	29271.	29317.	29369.
29432.	29520.	29647.	29835.	30129.	30704.	31885.	33943.	36936.	40656.
43776.	45375.	45154.	44828.	44413.	44013.	43642.	43302.	42990.	42707.
42452.	42222.	42013.	41822.	41644.	41462.	41325.	41170.	41002.	40811.
40601.	40377.	40149.	39938.	39665.	39429.	39166.	38900.	38653.	38410.
38177.	37793.	37757.	37534.	37337.	37149.	36966.	36751.	36622.	36460.
36303.	36152.	35997.	35857.	35732.	35602.	35477.	35356.	35240.	35127.
35018.	34911.	34808.	34708.	34611.	34517.	34426.	34338.	34252.	34168.
34087.	34009.	33931.	33859.	33787.	33719.	33650.	33585.	33521.	33460.

STAGE

903.9	903.9	903.9	903.9	903.9	903.9	903.9	903.9	903.9	903.9
903.9	903.9	904.0	904.0	904.0	904.0	904.0	904.1	904.1	904.1
904.1	904.2	904.2	904.3	904.5	904.6	905.3	906.3	907.8	909.6
911.1	911.3	911.5	911.6	911.4	911.2	911.1	910.9	910.7	910.6
910.5	910.4	910.3	910.2	910.1	910.0	909.9	909.8	909.8	909.7
909.6	909.4	909.3	909.2	909.1	909.0	908.9	908.7	908.6	908.5
908.4	908.3	908.2	908.1	908.0	907.9	907.8	907.7	907.6	907.6
907.5	907.4	907.3	907.3	907.2	907.1	907.1	907.0	907.0	906.9
906.9	906.8	906.7	906.7	906.7	906.6	906.6	906.5	906.5	906.4
906.4	906.4	906.3	906.3	906.3	906.2	906.2	906.2	906.1	906.1

PEAK OUTFLOW IS 32723. AT TIME 49.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	32728.	23984.	15726.	6571.	334787.
CMS	927.	471.	445.	186.	9480.
INCHES		6.25	13.57	17.01	18.05
MM		158.76	344.60	431.99	458.52
AC-FT		14372.	31192.	39102.	41503.
THOUS CU M		17728.	38474.	48231.	51193.

********** ********** ********** ********** **********

[illegible] MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2
				RATIOS APPLIED TO FLOWS	
				[illegible]	1.00
HYDROGRAPH AT	1	43.13	1	[illegible]	37192.
	(	[illegible])	(	[illegible]) (	1052.17) (
ROUTED TO	1	43.13	1	[illegible]	32726.
	(	[illegible])	(	270.65) (	926.70) (

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	903.90	903.90	909.80
STORAGE	28917.	28917.	41191.
OUTFLOW	0.	0.	2992.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	910.52	0.72	42550.	9558.	16.50	54.00	0.
1.00	911.81	2.01	45164.	13728.	27.00	49.50	0.

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION        JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**********************************

******************************************
THIS PROGRAM IS CURRENTLY BEING MODIFIED
TO RUN ON THE GAS HONEYWELL SYSTEM

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
TO MIKE TILLSON (X. 423) P.H 7-5566
*****************************************
  1     A HEMLOCK LAKE DAM      NY-477                               GENESEE RIVER BASIN
  2     A                       CITY OF ROCHESTER                   LIVINGSTON-ONTARIO COUNTY
  3     A                        ATER SUPPLY                         PMF - SNYDER UH
  4     B    150        1      30      0      0      0      0      0      0      0
  5     B1     5

  6     J      1        2       1

  7     J1   0.5        1

  8     K      0        1                                  1

  9     K1                      INFLOW HYDROGRAPH

 10     M      1        1   43.13         43.13   0.85                        1

 11     P            21.5      97    108    120    128

 12     T                                                1.0    0.1

 13     W   8.37    0.625

 14     X     45       45       1

 15     K      1        1                                 1

 16     K1                      ROUTED HYDROGRAPH AT DAM - NO BREACH ONE GATE +6/79 GATES

 17     Y                              1      1

 18     Y1     5                                      -903.9     -1

 19     Y4 903.6      901     902    903  903.9    904  904.7    905    906    907

 20     Y4   908      909   909.3  910.3

 21     Y5     0       16     235    574    981   1015   1413   1622   2485   3528

 22     Y5  4785     6016    6430   7351

 23     $S 28917    41101   42143

 24     $E 903.7    909.3   910.5

 25     $$ 903.3

 26     $D 909.4    3.087     1.5   3200
```

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC METERS PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2
				RATIOS APPLIED TO FLOWS	
				.50	1.00
HYDROGRAPH AT	1	43.13	1	18579.	37157.
	(	0.00)	(	526.0)(	1052.1)(
ROUTED TO	1	43.13	1	6807.	31636.
	(	0.00)	(	192.6)(	895.8)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	893.90	900.00	909.80
STORAGE	25917.	28917.	41101.
OUTFLOW	981.	0.	6696.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	907.72	0.	40693.	6202.	0.	57.00	0.
1.00	911.59	1.79	44607.	31030.	17.50	49.50	0.

```
************************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
************************************

************************************
THIS PROGRAM IS CURRENTLY BEING MODIFIED
TO RUN ON THE DOS HONEYWELL SYSTEM

PLEASE REPORT ANY UNUSUAL OPERATING PROBLEMS
TO MIKE TILLSON (NY, 423) 211 7-5665
************************************
    1      A HEMLOCK LAKE DAM      NY-477                            GENESEE RIVER BASIN
    2      A                       CITY OF ROCHESTER                 LIVINGSTON-ONTARIO COUNTY
    3      A                       WATER SUPPLY                      PMF - SNYDER UH
    4      B    150       1      30       0       0       3       0       0       0       0
    5      B1     5
    6      J      1       2       1
    7      J1   0.5       1
    8      K      0       1                                       1
    9      K1                      INFLOW HYDROGRAPH
   10      M      1       1   43.13           43.13    0.45                               1
   11      P           21.5      97     108     120     123
   12      T                                                    1.0     0.1
   13      W   8.37   0.625
   14      X     55      44       1
   15      K      1       1                                       1
   16      K1                      ROUTED HYDROGRAPH AT DAM - NO BREACH BOTHGATES+6/79 GATES
   17      Y                                1       1
   18      Y1     5                                          -903.9      -1
   19      Y4 900.8     901     902     903   903.9     904   904.7     905     906     907
   20      Y4   908     909   909.3   910.3
   21      Y5     0      32     470    1156    1962    2018    2756    3111    4485    6066
   22      Y5  7313    9634   10276   11227
   23      $S 24917   41101   42113
   24      $E 903.9   909.4   910.3
   25      $$ 903.1
```

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	893.90	900.80	909.80
STORAGE	2-917.	26917.	41101.
OUTFLOW	1962.	0.	10799.

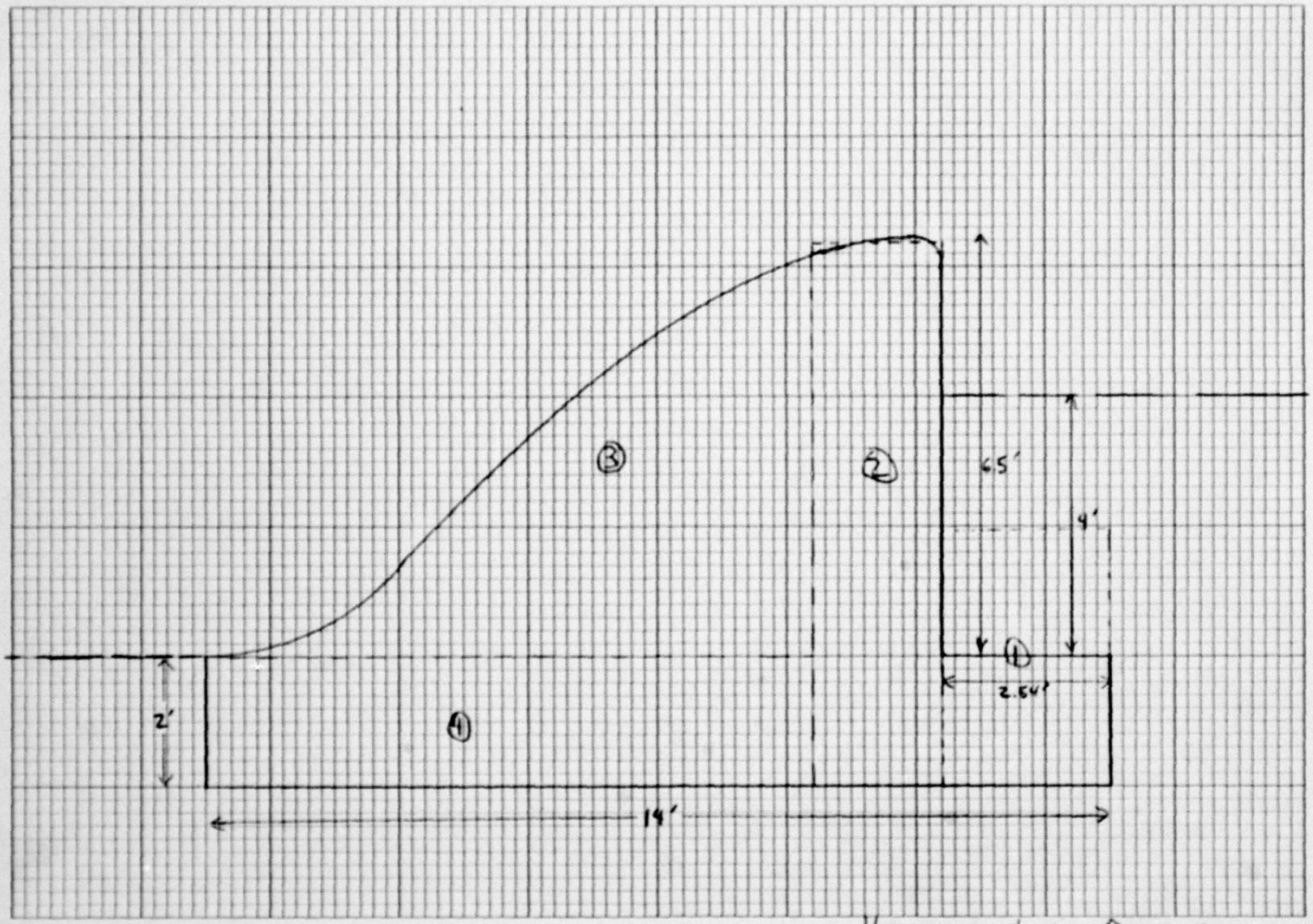
RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	908.52	0.	38465.	9795.	0.	54.00	0.
1.00	911.23	1.43	44097.	30139.	13.50	49.50	0.

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOW IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2
				FLOW RATIOS APPLIED TO FLOWS	
				0.50	1.00
HYDROGRAPH AT	1	43.13	1	1937.	37157.
	(	0.30)	(	54.8)(	1052.1)(
ROUTED TO	1	43.13	1	9795.	30139.
	(	0.30)	(	277.3)(	853.4)(

APPENDIX D

STABILITY COMPUTATIONS



HEMLOCK LAKE DAM - SPILLWAY SECTION

00-15-1 (3/78)
Formerly GA-17

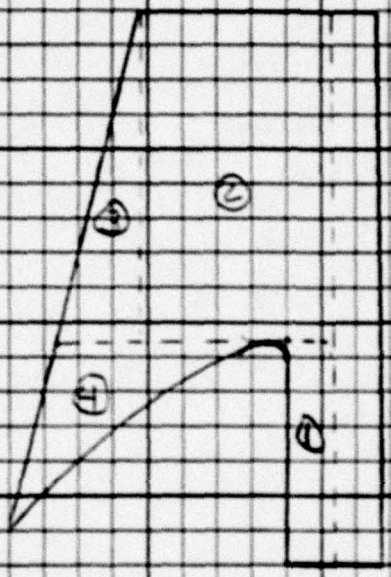
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	1		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS		RLW	8/9/79

CALCULATE LOADS DUE TO BRIDGE CONCRETE

1. PIERS



VOLUMES PER PIER

① (1.27)(6.5)(2) = 16.51

② (9.5)(5.27)(2) = 100.13

③ ½(9.5)(2.6)(2) = 24.7

④ ½(2.6)(18.5)(2) = 3.51

144.85 ft³

(144.85 ft³)(7 PIERS) = 1013.9 ft³

$\frac{1013.9 ft^3}{78 ft} = 13.0 \frac{ft^3}{ft}$ OF DAM

2. CONCRETE BRIDGE DECK

(4 ft)(4 ft) = 1.64 ft³/ft OF DAM

00-15-1 (3/78)
Formerly GA-17

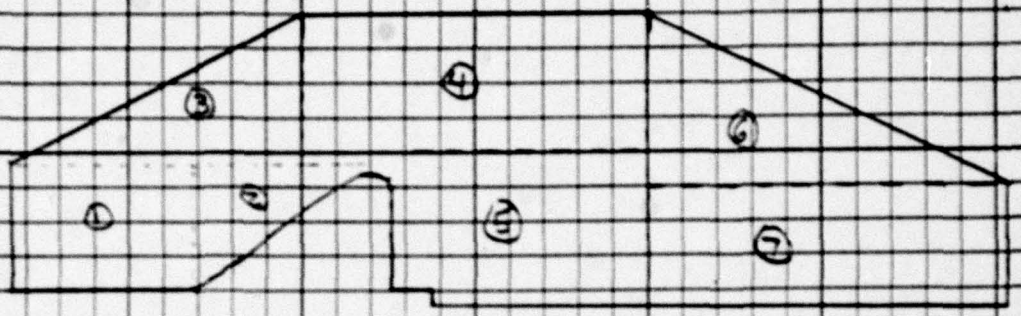
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	2		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS		RLW	8/9/79

BRIDGE LOADS (CONT.)

3. ABUTMENTS



VOLUMES

(1) $(10.5)(7.5)(2) = 157.5\ ft^3$

(2) $\frac{1}{2}(10)(7.5)(2) = 75.0\ ft^3$

(3) $\frac{1}{2}(17)(8.5)(2) = 144.5\ ft^3$

(4) $20(8)(9) = 640\ ft^3$

(5) $15(9)(4) = 540\ ft^3$

(6) $\frac{1}{2}(30.5)(10)(2) = 205\ ft^3$

(7) $(20.5)(7)(2) = 287\ ft^3$

$(2049\ ft^3)(2\ Abut) = \frac{4098\ ft^3}{78\ ft} = 52.5\ ft^3/ft$ of dam

TOTAL VOLUME TO BE ADDED = $13.0 + 1.6 + 52.5 = 67.1\ ft^3$

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	3		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS		RLW	8/9/79

1. CONVERT BLOCK OF SOIL ABOVE UPSTREAM TOE TO AN EQUIVALENT SECTION OF CONCRETE

$(4)(2.54)(.060\ K/ft^3) = .61K$ $\qquad \frac{.61K}{.15K/ft^3} = 4.07\ ft^3$

2. BREAK SECTION INTO AREAS

	AREA	DISTANCE FROM TOE TO CENTROID
① $(2.54)(2) + 4.07$	$= 9.15ft^3$	12.7'
② $(2)(7.75)$	$= 15.5ft^3$	10.5'
③ $\frac{1}{2}(9.2)(6.2) + 67.14$	$= 95.66ft^3$	6.3'
④ $(9.46)(2)$	$= 18.92ft^3$	9.7'

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	4		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSIS		RLW	8/9/79

ADD EFFECT OF DOWNSTREAM SLAB TO SLIDING RESISTANCE

SLAB $60'(1)(1)(.15K/FT^3) = 9K$

$(9K)(.5) = 4.5K$ SLIDING RESISTANCE

NORMAL CONDITIONS

$$F.S._{SLIDING} = \frac{\text{RESISTING FORCE + SLAB RESISTANCE}}{\text{DRIVING FORCE}} = \frac{8.60 + 4.5}{2.58} = 5.07$$

ICE LOADING

$$F.S._{SLIDING} = \frac{8.60 + 4.5}{7.58} = 1.73$$

½ PMF LOADING

$$F.S._{SLIDING} = \frac{8.6 + 4.5}{6.97} = 1.96$$

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
HEMLOCK LAKE DAM	5		
SUBJECT		COMPUTED BY	DATE
STABILITY ANALYSES - SEISMIC ANALYSIS		RLW	8/9/79

SUMMATIONS OF MOMENTS AND FORCES TAKEN FROM CALCULATOR STABILITY PROGRAM

NORMAL CONDITIONS - WATER AT SPILLWAY CREST - NO ICE

1. CALCULATE HORIZONTAL FORCE ON UPSTREAM FACE DUE TO WATER PRESSURE

$P_e = CrwH = .7(.1)(.0624)(8.5) = .037\ K/ft^2$

C = coefficient
w = weight of water
h = height

2. CALCULATE MOMENT & FORCE OF EARTHQUAKE

$M_e = .299\ P_e y^2 = (.299)(.037)(8.5)^2 = .80\ K\text{-}ft$

$V_e = .726\ P_e y = (.726)(.037)(8.5) = .23\ K\text{-}ft$

3. REDUCE WEIGHT OF CONCRETE BY 5%

$(.15)(.95) = .142$

4. REVISED OVERTURNING SAFETY FACTOR - SEISMIC ANALYSIS

$$F.S. = \frac{\text{RESISTING MOMENTS}}{\text{OVERTURNING MOM.} + \text{EARTHQUAKE MOM.}} = \frac{138.68}{45.77 + .80} = 2.98$$

5. REVISED SLIDING SAFETY FACTOR - SEISMIC ANALYSIS

$$F.S. = \frac{\text{RESISTING FORCE}}{\text{SLIDING FORCE} + \text{EARTHQUAKE FORCE}} = \frac{8.08}{2.58 + .23} = 2.88$$

INPUT TO STABILITY ANALYSIS PROGRAM

INPUT ENTRY	PROGRAM No.
Unit Weight of Dam (K/ft^3)	0
Area of Segment No. 1 (ft^2)	1
Distance from Center of Gravity of Segment No. 1 to Downstream Toe (ft)	2
Area of Segment No. 2 (ft^2)	3
Distance from Center of Gravity of Segment No. 2 to Downstream Toe (ft)	4
Area of Segment No. 3 (ft^2)	5
Distance from Center of Gravity of Segment No. 3 to Downstream Tow (ft)	6
Base Width of Dam (Total) (ft)	7
Height of Dam (ft)	8
Ice Loading (K/L ft.)	9
Coefficient of Sliding	10
Unit Weight of Soil (K/ft^3)	11
Active Soil Coefficient - Ka	12
Passive Soil Coefficient - Kp	13
Height of Water over Top of Dam or Spillway (ft)	14
Height of Soil for Active Pressure (ft)	15
Height of Soil for Passive Pressure (ft)	16
Height of Water in Tailrace Channel (ft)	17
Weight of Water (K/ft^3)	18
Area of Segment No. 4 (ft^2)	19
Distance from Center of Gravity of Segment No. 4 to Downstream Toe (ft)	20
Height of Ice Load or Active Water (ft)	46

NORMAL CONDITIONS

0.15	RCL 1
9.2	
9.2	RCL 2
12.7	
12.7	RCL 3
15.5	
15.5	RCL 4
10.5	
10.5	RCL 5
95.66	
95.66	RCL 6
6.3	
6.3	RCL 7
14.	
14.	RCL 8
8.5	
8.5	RCL 9
0.	
0.	RCL 10
0.5	
0.5	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
0.	
0.	RCL 15
6.	
6.	RCL 16
2.	
2.	RCL 17
2.	
2.	RCL 18
0.0624	
0.0624	RCL 19
18.9	
18.9	RCL 20
4.7	
4.7	RCL 46
8.5	

3.18[illegible]102445 ← F.S. OVERTURNING

6.145952179

~~[illegible]~~

NORMAL WATER PLUS 5000 lb ICE LOAD

0.15	RCL 1
9.2	
9.2	RCL 2
12.7	
12.7	RCL 3
15.5	
15.5	RCL 4
10.5	
10.5	RCL 5
95.66	
95.66	RCL 6
6.3	
6.3	RCL 7
14.	
14.	RCL 8
8.5	
8.5	RCL 9
5.	
5.	RCL 10
0.5	
0.5	RCL 11
0.055	
0.055	
0.33	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
0.	
0.	RCL 15
6.	
6.	RCL 16
2.	
2.	RCL 17
2.	
2.	RCL 18
0.0624	
0.0624	RCL 19
18.9	
18.9	RCL 20
4.7	
4.7	RCL 46
8.5	

→ 1.653620317

½ PMF - WATER 1.72'
OVER SPILLWAY

0.15	RCL 1
9.2	
9.2	RCL 2
12.7	
12.7	RCL 3
15.5	
15.5	RCL 4
10.5	
10.5	RCL 5
95.66	
95.66	RCL 6
6.3	
6.3	RCL 7
14.	
14.	RCL 8
8.5	
8.5	RCL 9
0.	
0.	RCL 10
0.5	
0.5	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
7.72	
7.72	RCL 15
6.	
6.	RCL 16
2.	
2.	RCL 17
2.	
2.	RCL 18
0.0624	
0.0624	RCL 19
18.9	
18.9	RCL 20
4.7	
4.7	RCL 46
8.5	

2.3[illegible]0583003 ← F.S. OVERTURNING
5.078469075
~~1.[illegible]~~

SEISMIC ANALYSIS

0.1425	RCL 1
9.2	
9.2	RCL 2
12.7	
12.7	RCL 3
15.5	
15.5	RCL 4
10.5	
10.5	RCL 5
95.66	
95.66	RCL 6
6.3	
6.3	RCL 7
14.	
14.	RCL 8
8.5	
8.5	RCL 9
0.	
0.	RCL 10
0.5	
0.5	RCL 11
0.055	
0.055	RCL 12
0.33	
0.33	RCL 13
3.	
3.	RCL 14
0.	
0.	RCL 15
6.	
6.	RCL 16
2.	
2.	RCL 17
2.	
2.	RCL 18
0.0624	
0.0624	RCL 19
18.9	
18.9	RCL 20
4.7	
4.7	RCL 46
8.5	

~~9.[illegible]~~
6.0[illegible]330292
~~8.[illegible]~~

APPENDIX E

REFERENCES

APPENDIX E

REFERENCES

1) U.S. Army, Corps of Engineers:

Engineering Manual 1110-2-1405; Flood-Hydrograph Analyses and Computations, August 1959

HEC-1 Flood Hydrograph Package - Dam Safety Version, September 1978

2) U.S. Department of Agriculture, Soil Conservation Service; National Engineering Handbook; Section 4 - Hydrology, August 1972

3) U.S. Department of Commerce; Weather Bureau; Hydrometeorological Report No. 33 - Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours, April 1956

4) U.S. Department of the Interior, Bureau of Reclamation; Design of Small Dams, 2nd Edition (rev. reprint), 1977

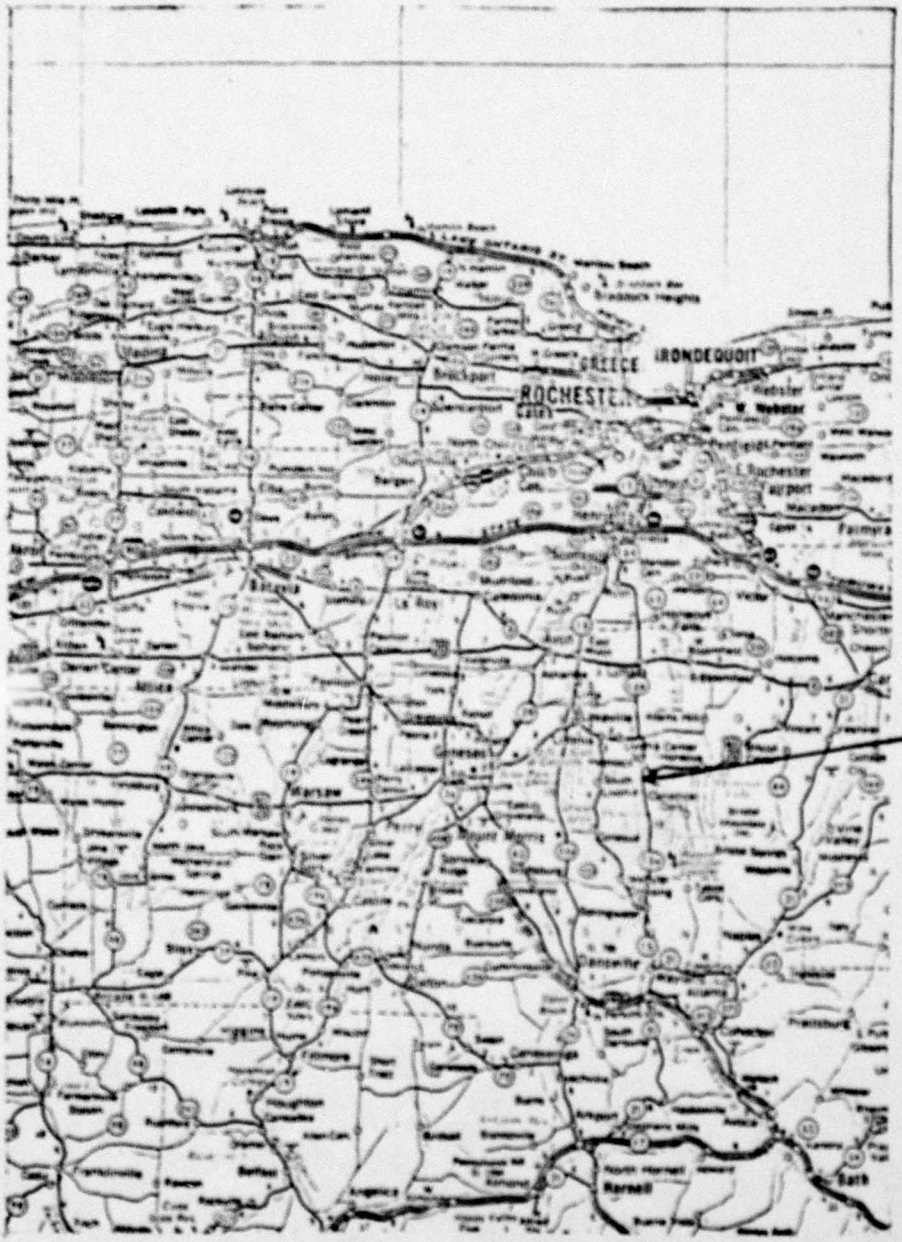
5) H.W. King and E.F. Brater; Handbook of Hydraulics, 5th Edition, McGraw-Hill, 1963

6) University of the State of New York; Geology of New York, Education Leaflet 20, (reprint) 1973

7) City of Rochester, Bureau of Water - 7/27/79 communication

APPENDIX F

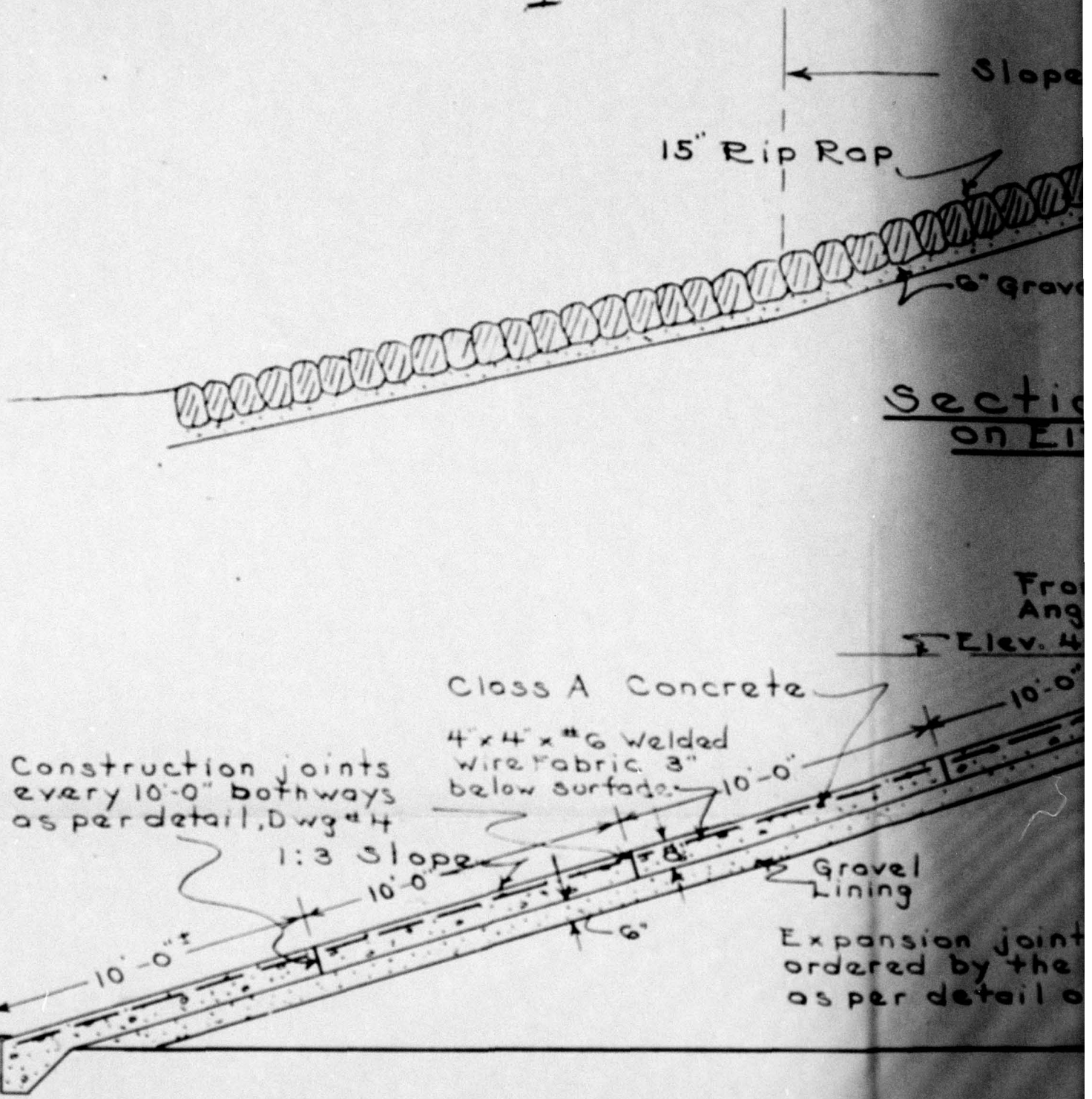
DRAWINGS



Vicinity Map

Hemlock Lake Dam

1



Section on
on Li

Fro
Ang
Elev. 4

½" ϕ slip-dowel 2'-0" long spaced as on Channel Floor. See Dwg No. 4

½" Bituminous joint material 2" deep

4"x4"x#6 Welded Wire Fabric

Approved dowel tube to permit free movement of one

Class A Concrete

½" Premoulded nonextruding expansion joint material

Construction Joint

Section on ℄ of F
Showing Proposed F
Scale: 1" = 4'

Details of Expansion Joint

1

Front Angle

Elev. 401.75 ±

stone curb 16" deep min.

2

402.5

1:1.5 slope

6" Gravel

pe: 1:3 ±

Where ordered by the Engineer 4" Minimum stone paving blocks grouted, ½" premoulded expansion joints every 40 feet. Paving blocks furnished by the City at storage pile located near highway bridge.
This shall apply to all sections.

avel

ion Showing Method of Paving Either Side of Spillway

Scale: 1" = 4'-0"

Elev = 402.5

20' - 0"

ront Angle

. 400.0' ±

-0"

See above section

Top slot to be Sealed with grout

Class C Concrete

Stop Planks to be left in place

1:1.5 S

Earth Embankment

12"

12"

ints where he Engineer l on Dwg # 4.

Present Stone Paving

Stone to be removed and to be replaced with Concrete footing for wall

Existing Spillway Fill and Paving.

e end of dowel

12"

Elev. 400.33 ±

1" R

Tar paper between joints

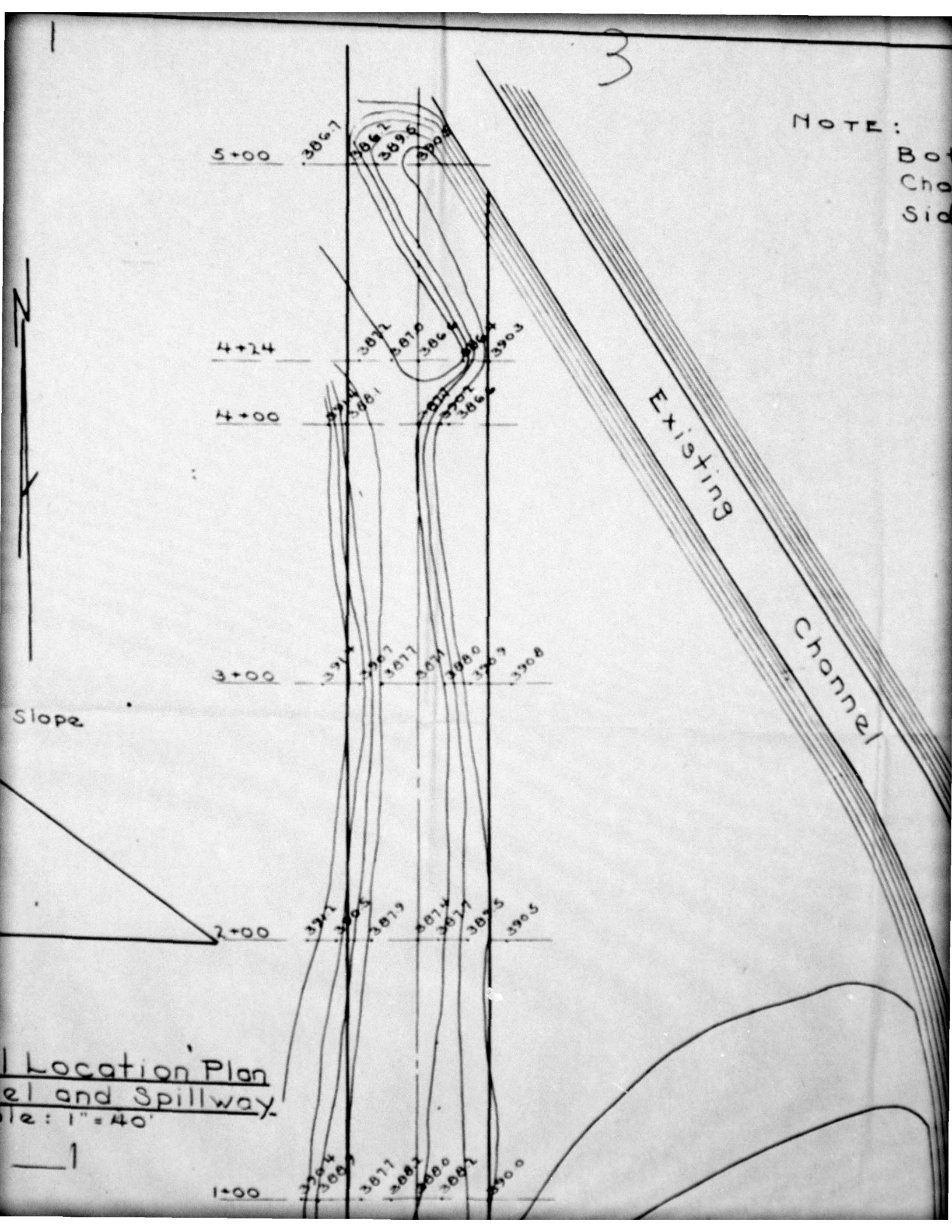
Class A Concrete

12"

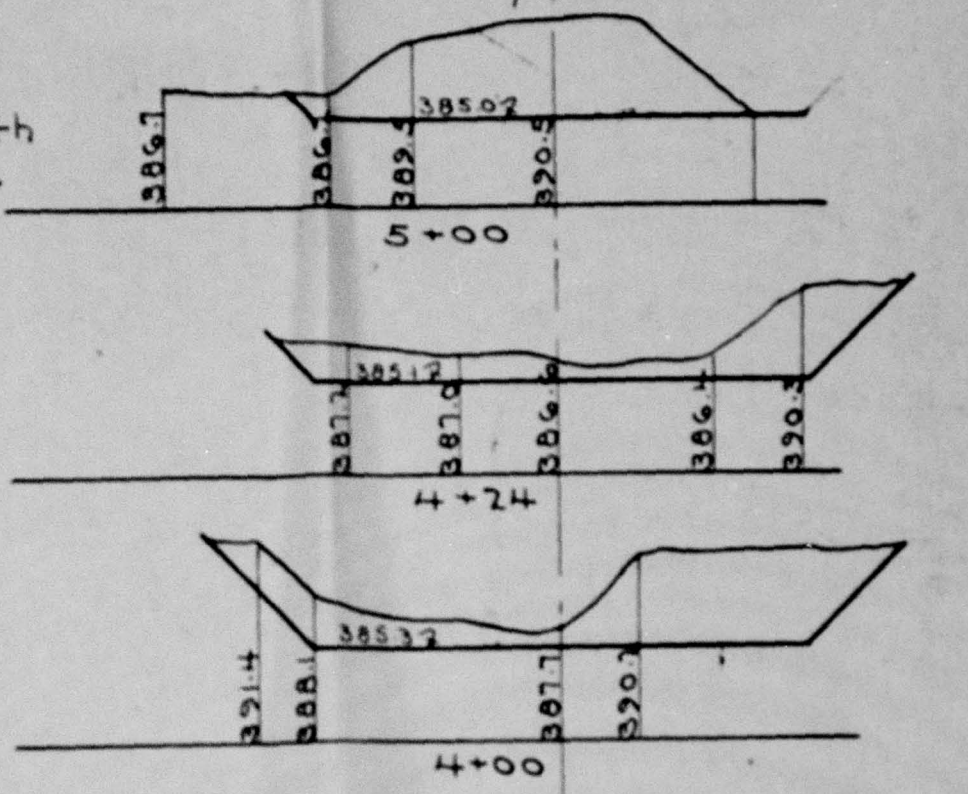
8"

General of Channe

Scal

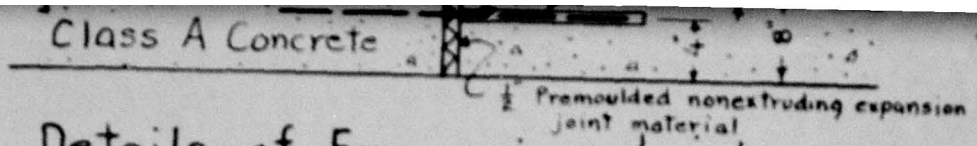

1
3
NOTE:
Bo
Cha
Sid
5+00
4+24
4+00
3+00
2+00
1+00
Existing
Channel
Slope
l Location Plan
el and Spillway
le: 1" = 40'
1

Bottom width of Earth Channel to be 56'-0".
Side slopes 1:1.5



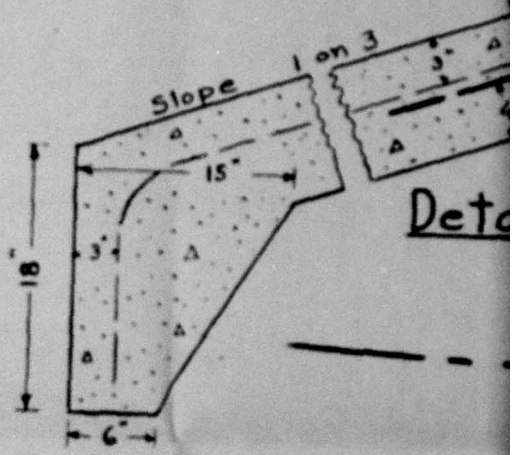
Base of all Sections = 380'

Scale of Sections
Hor. 1"=20', Vert. 1"=10'

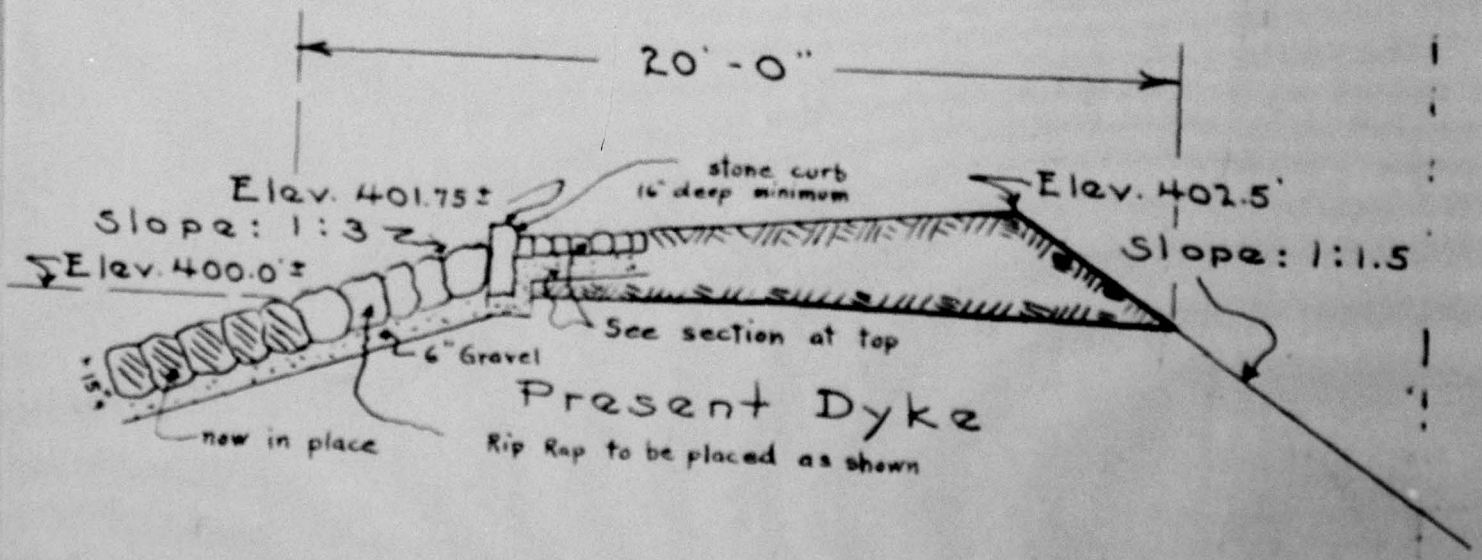


Details of Expansion Joint in Concrete Apron

Scale : 1" = 1'-0"

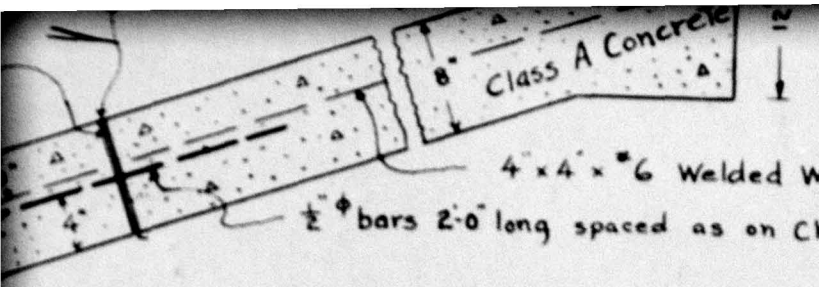


Extend Dyke Westerly as order by the Engineer



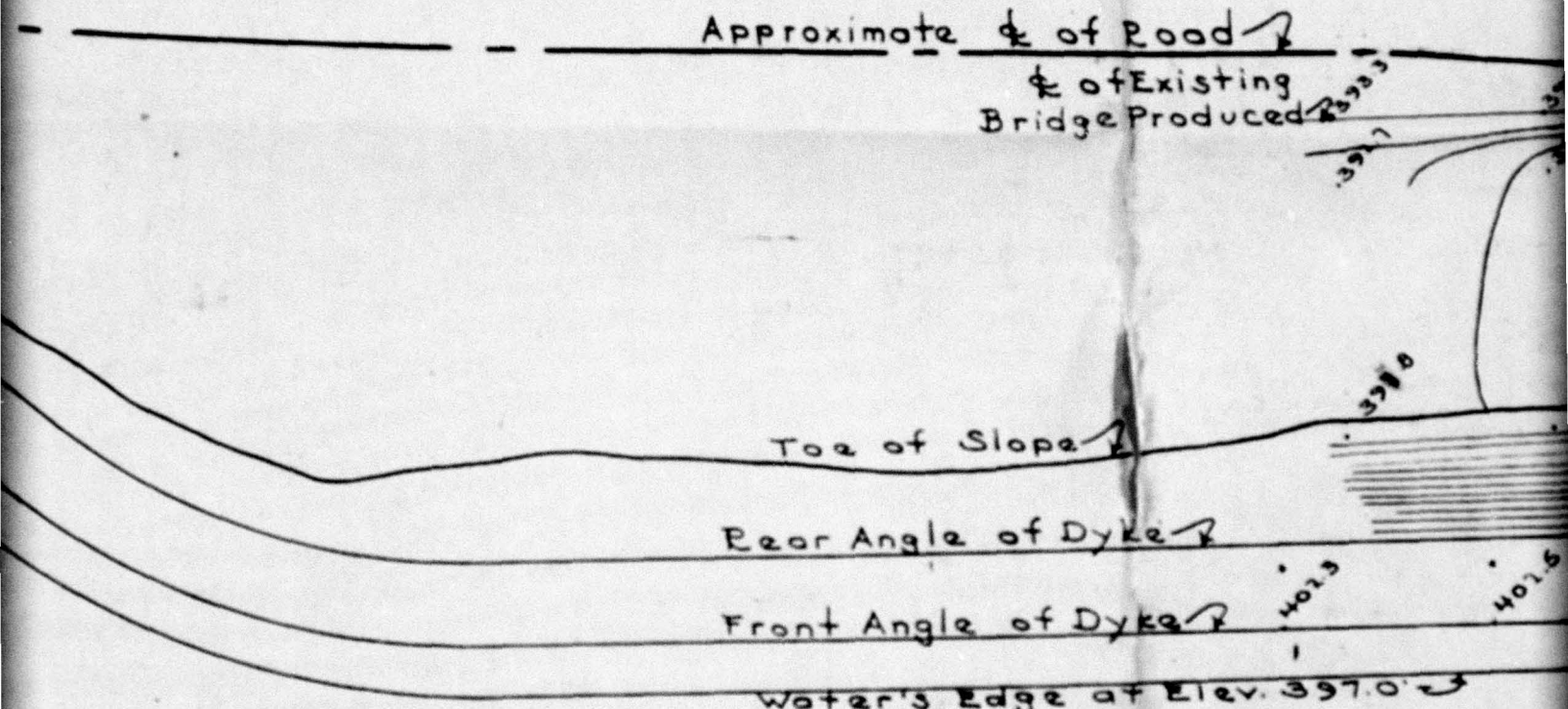
Section of Dyke Showing Earth Fill Required to Obtain the Proper Elevation

Scale: 1" = 4'-0"

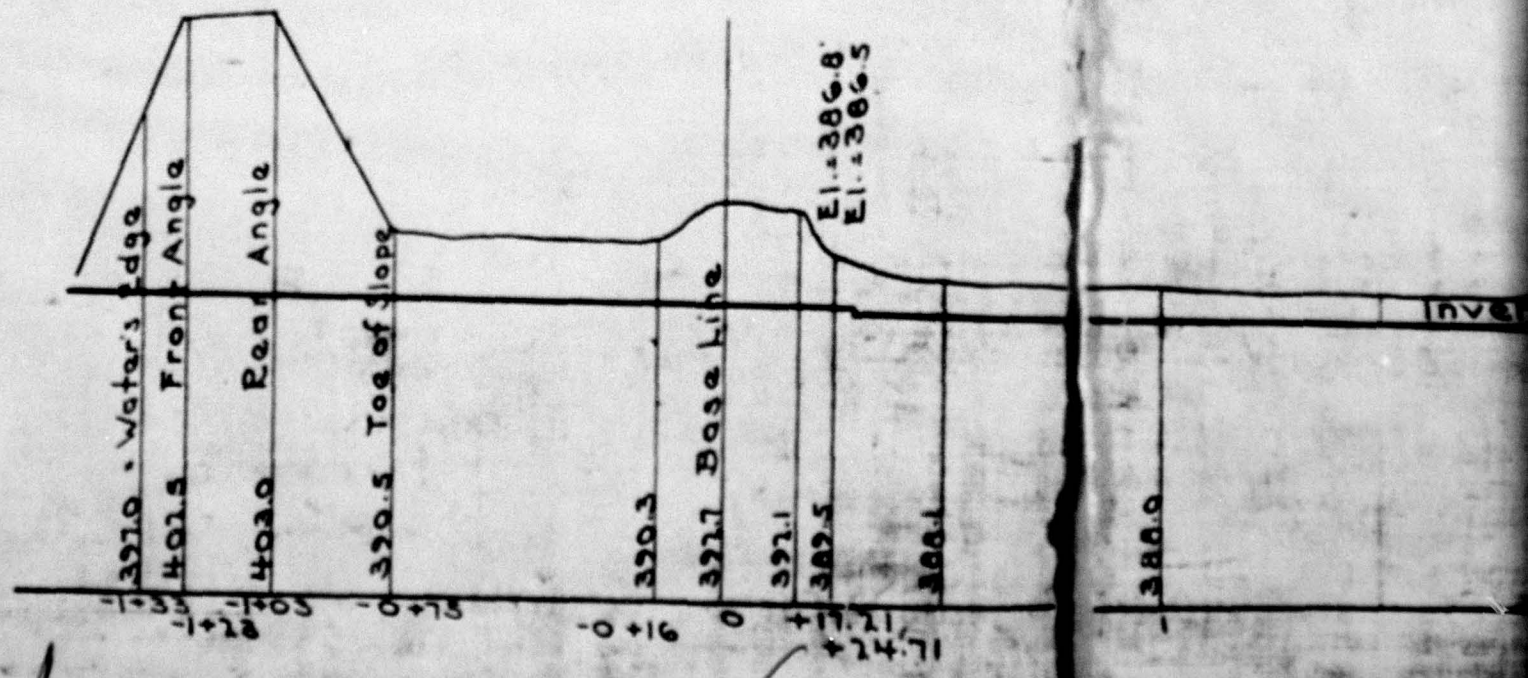


etails of Concrete Apron

Scale : 1" = 1'-0"

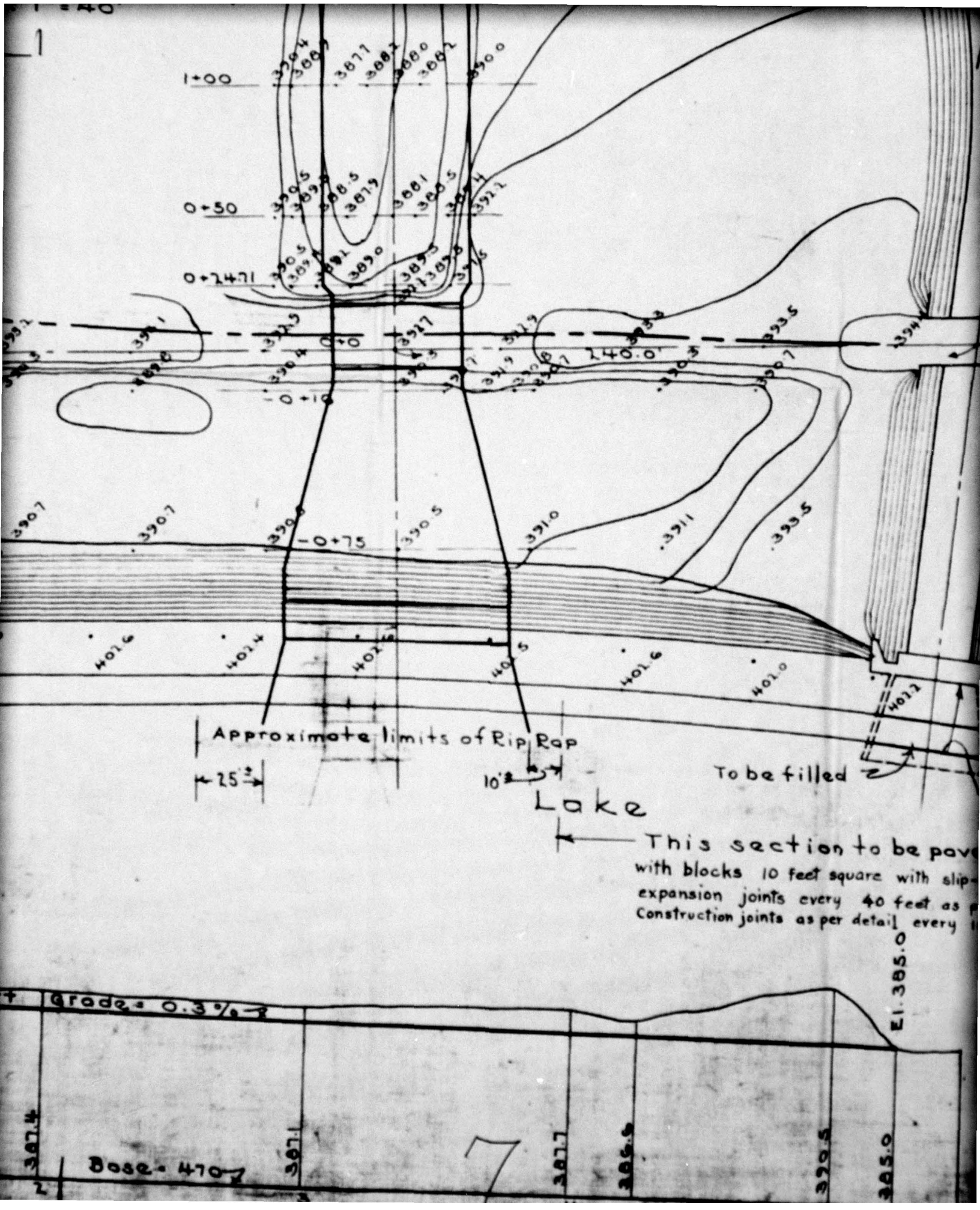


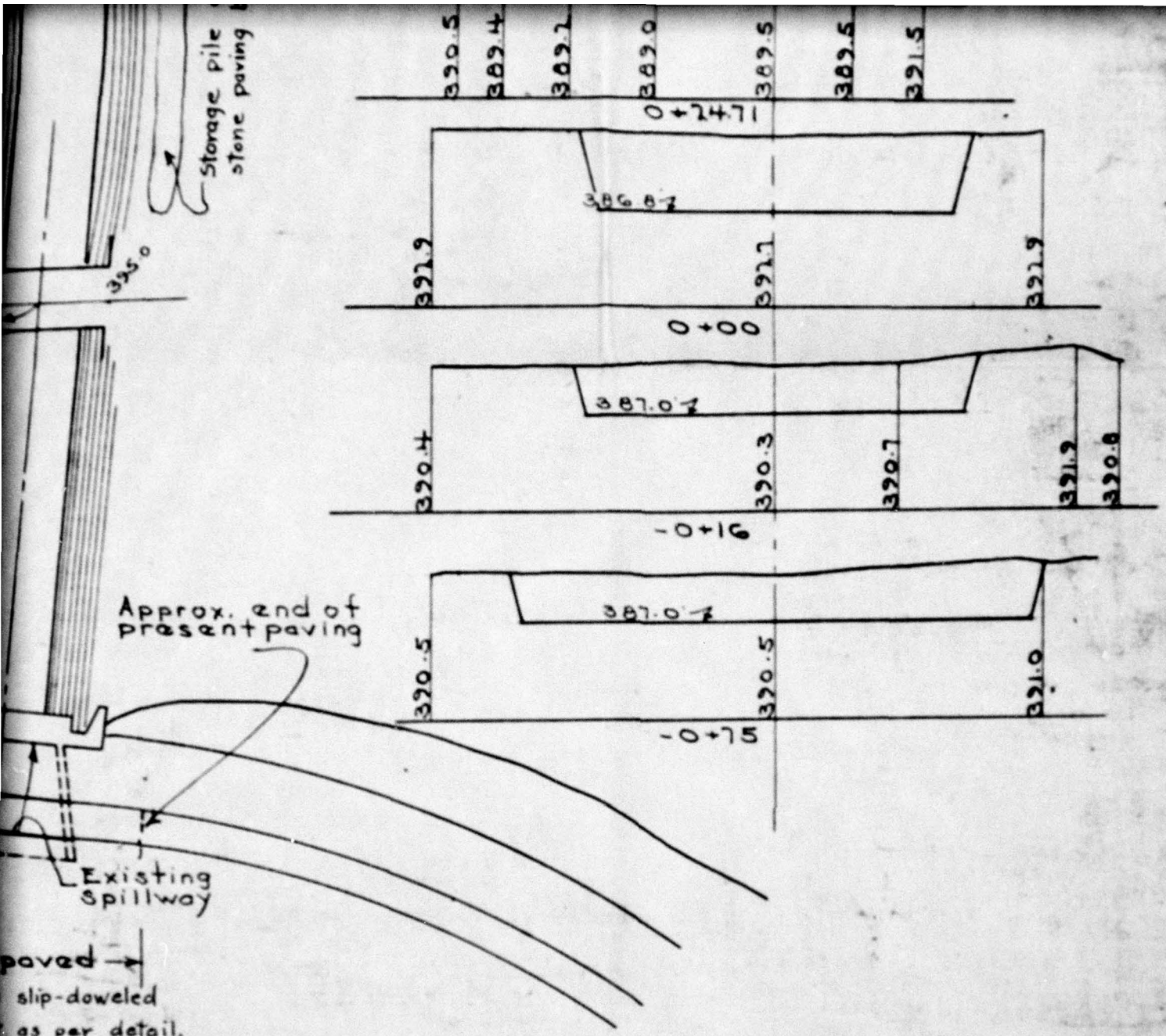
Hemlock



1 6

Profile on

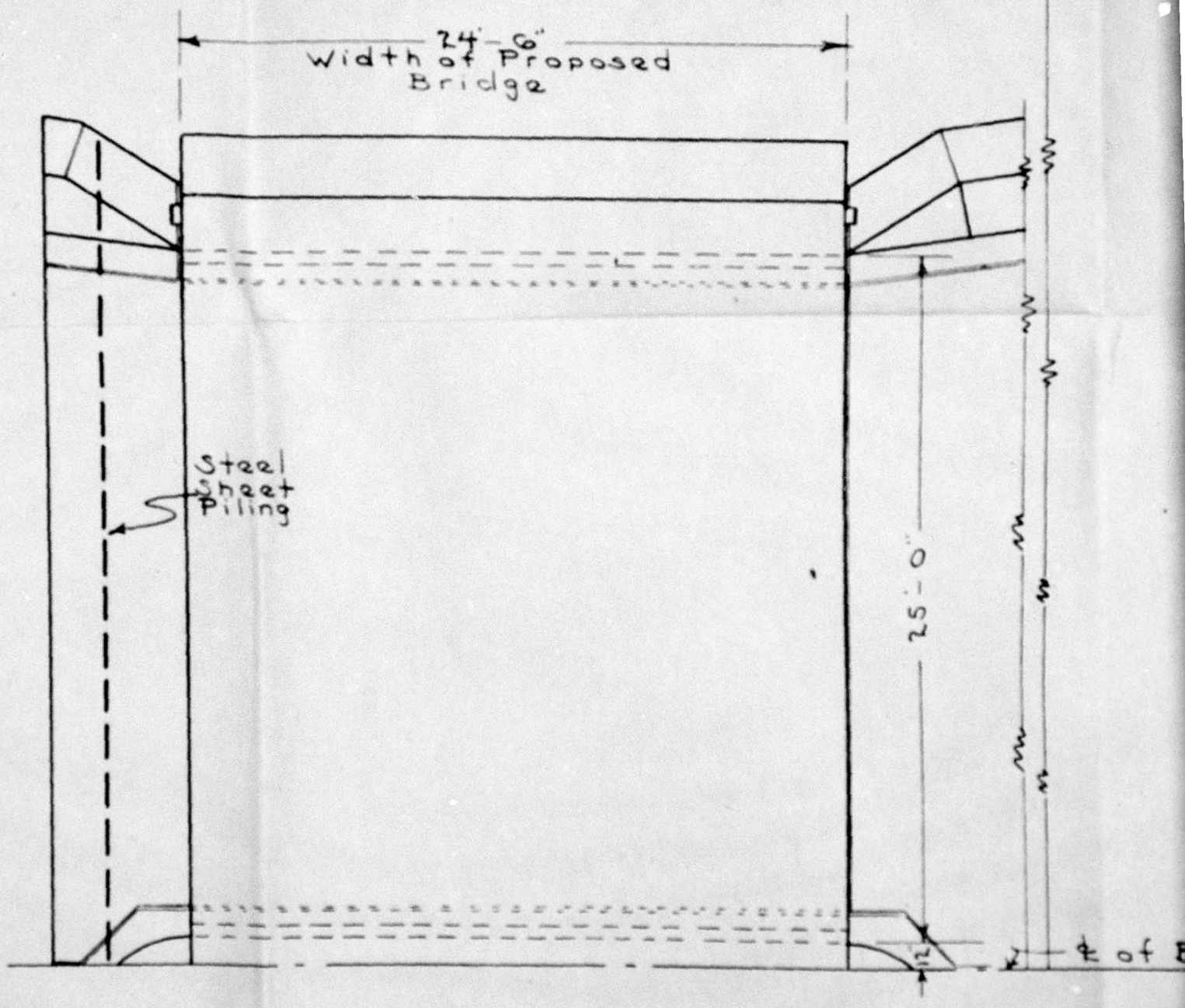

1+00
0+50
0+24.71
0+0
-0+10
-0+75
240.0'
Approximate limits of Rip Rap
25'
10'
To be filled
Lake
This section to be pave
with blocks 10 feet square with slip-
expansion joints every 40 feet as
Construction joints as per detail every
Grade = 0.3%
El. 385.0
Base - 470
7



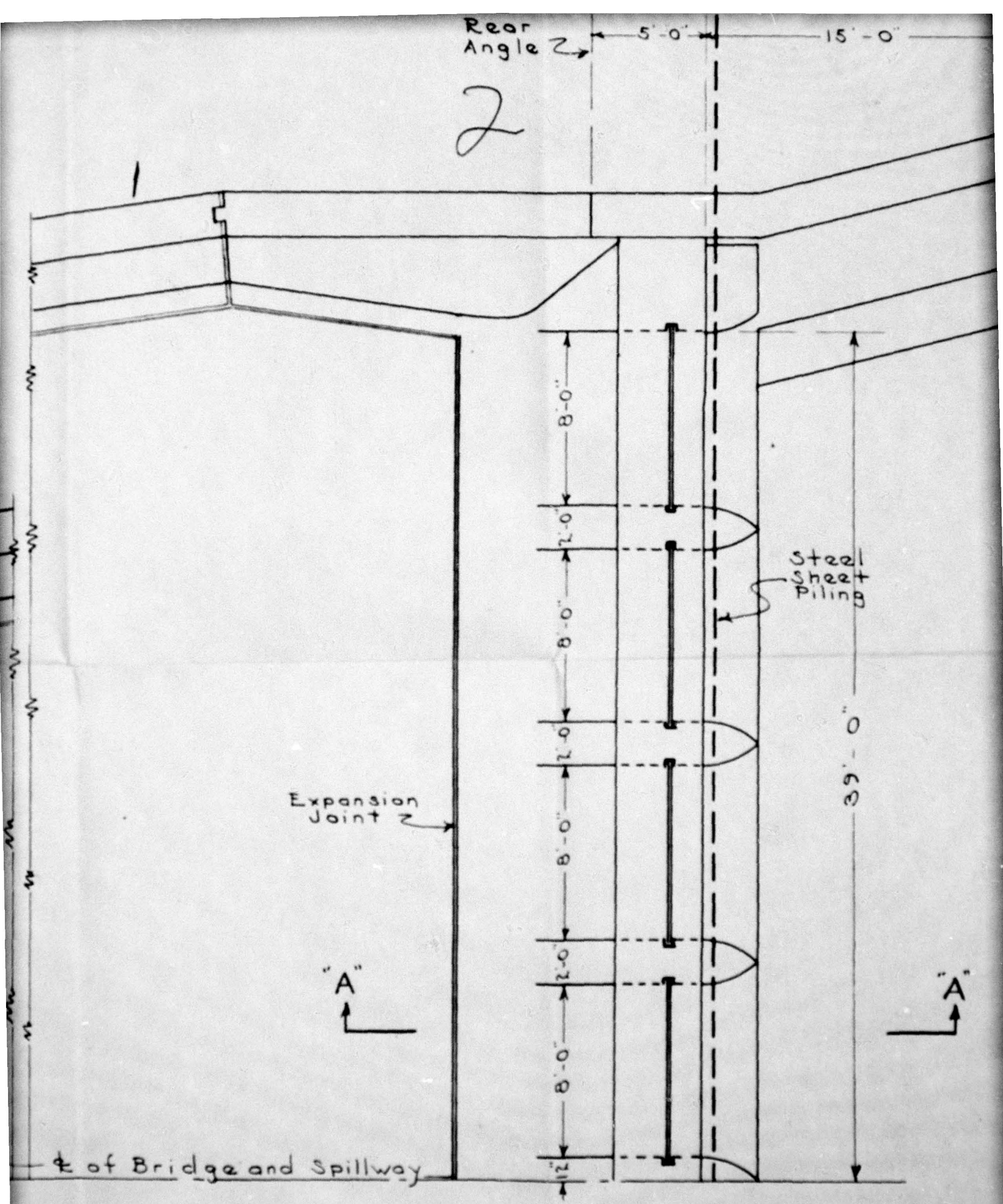
Approved by Supervising Engineer	Approved by City Engineer	Approved by Comm. of Public Works
Henry L. Howe	Margaret B. Hayes	Thos. J. Normoyle

Design by W. A. Zollweg	DEPARTMENT OF PUBLIC WORKS DIVISION OF ENGINEERING ROCHESTER, N.Y.
Ordinance No 4478	GENERAL PLAN, PROFILE, CHANNEL & DYKE SECTIONS
Project No PWA 1169 N.Y.	
File No	Drawn by H.P. Heislein Traced by H.P. Heislein Checked by Zollweg Approved by [illegible] Date: Oct. 2, 1936 Scale: As shown DWG. NO. [illegible]

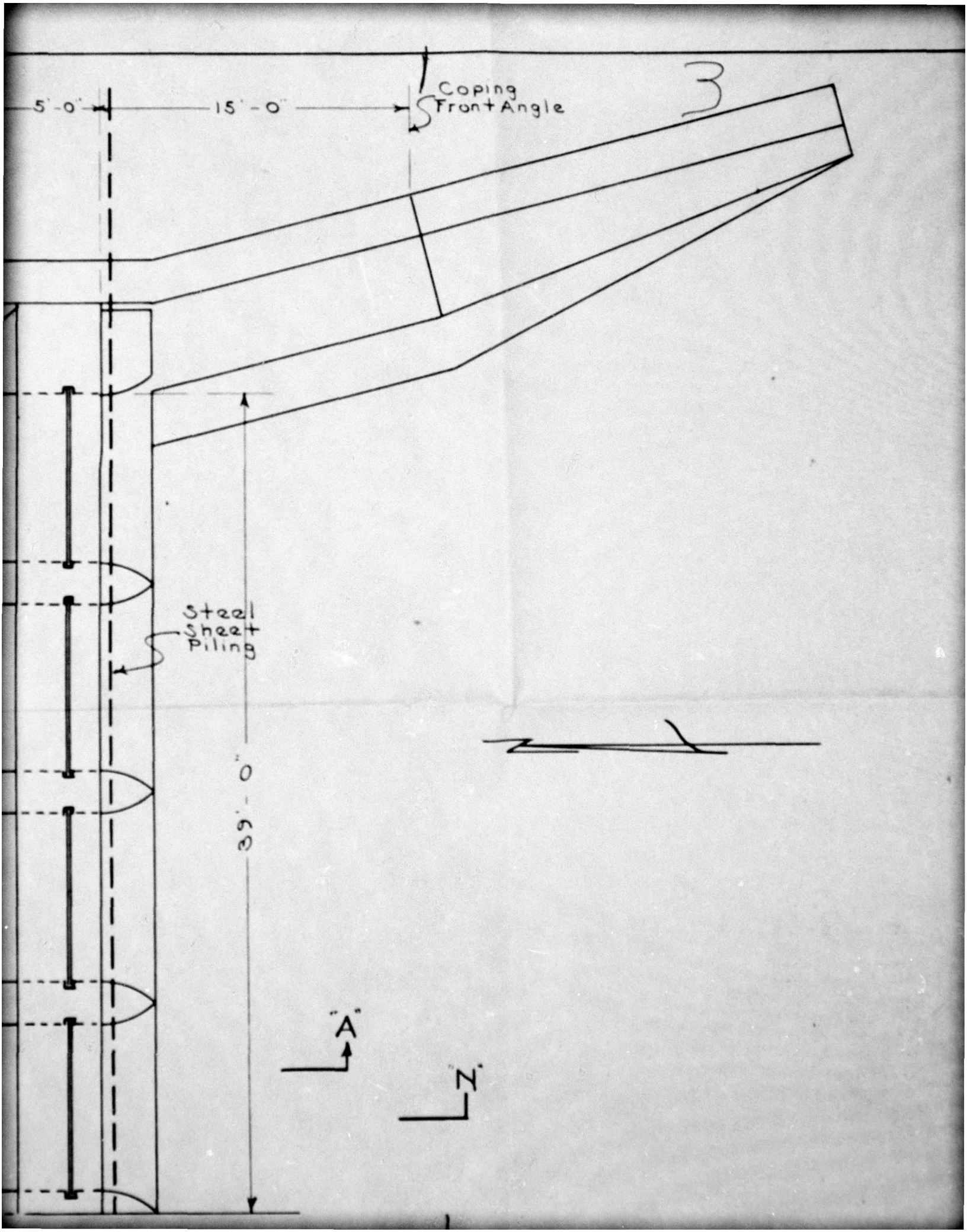
1



Plan of East Half of E



℄ of Bridge and Spillway


5'-0"
15'-0"
Coping
Front Angle
3
Steel
Sheet
Piling
39'-0"
"A"
"N"

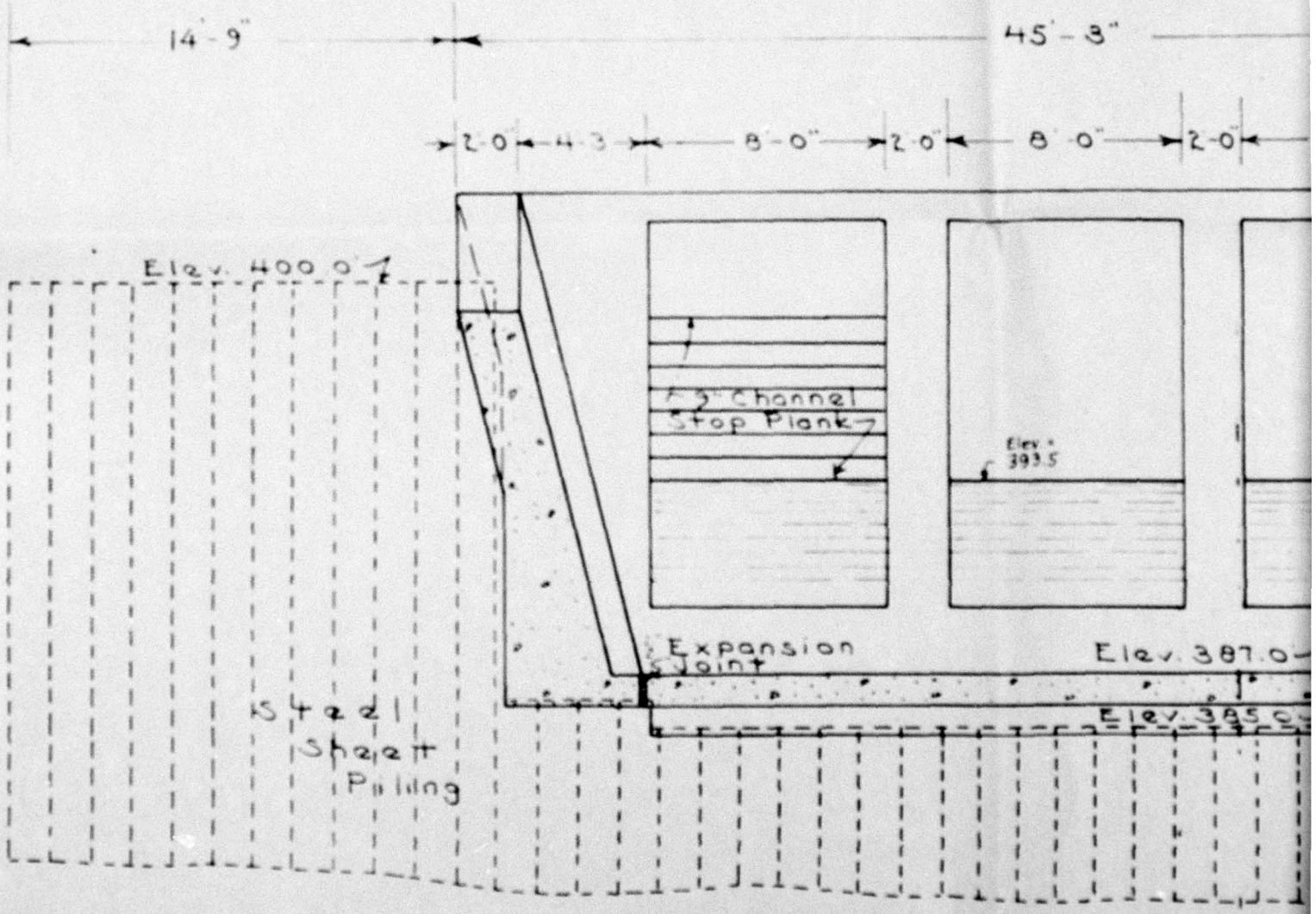
AD-A075 858 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. HEMLOCK LAKE DAM, INVENTORY NUMBER--ETC(U)
SEP 79 G KOCH DACW51-79-C-0001

UNCLASSIFIED NL

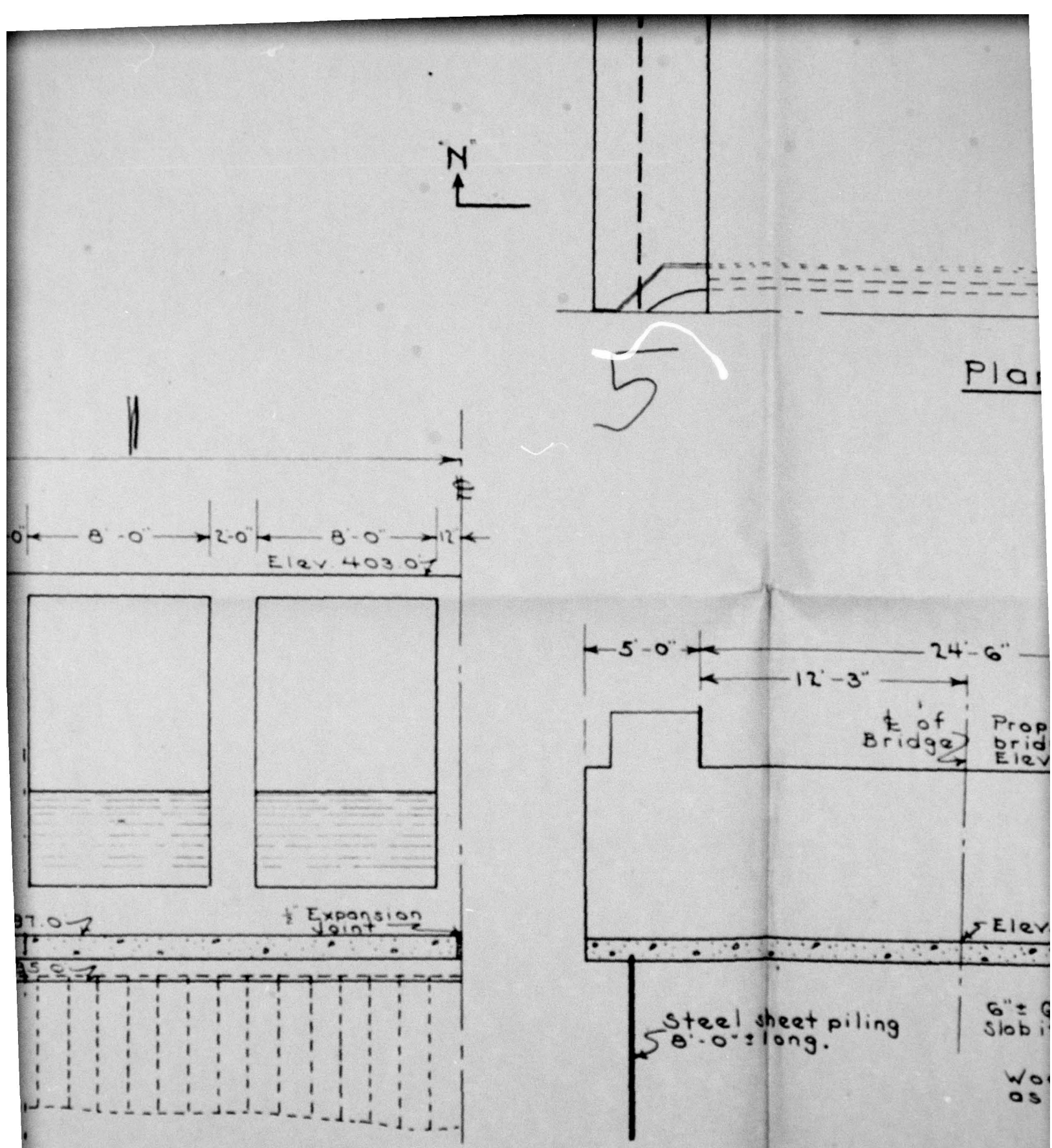
2 OF 2
AD-
A075858

END
DATE FILMED
11-79
DDC

4



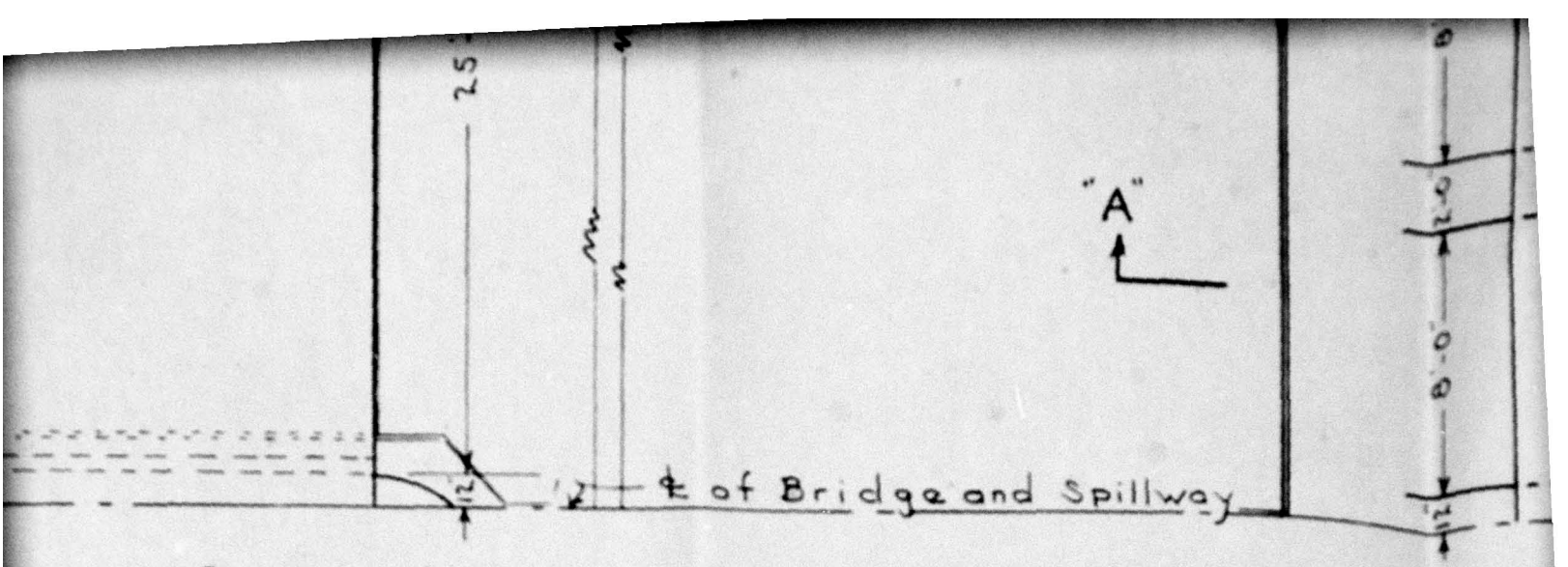
Section "M-M" East Half



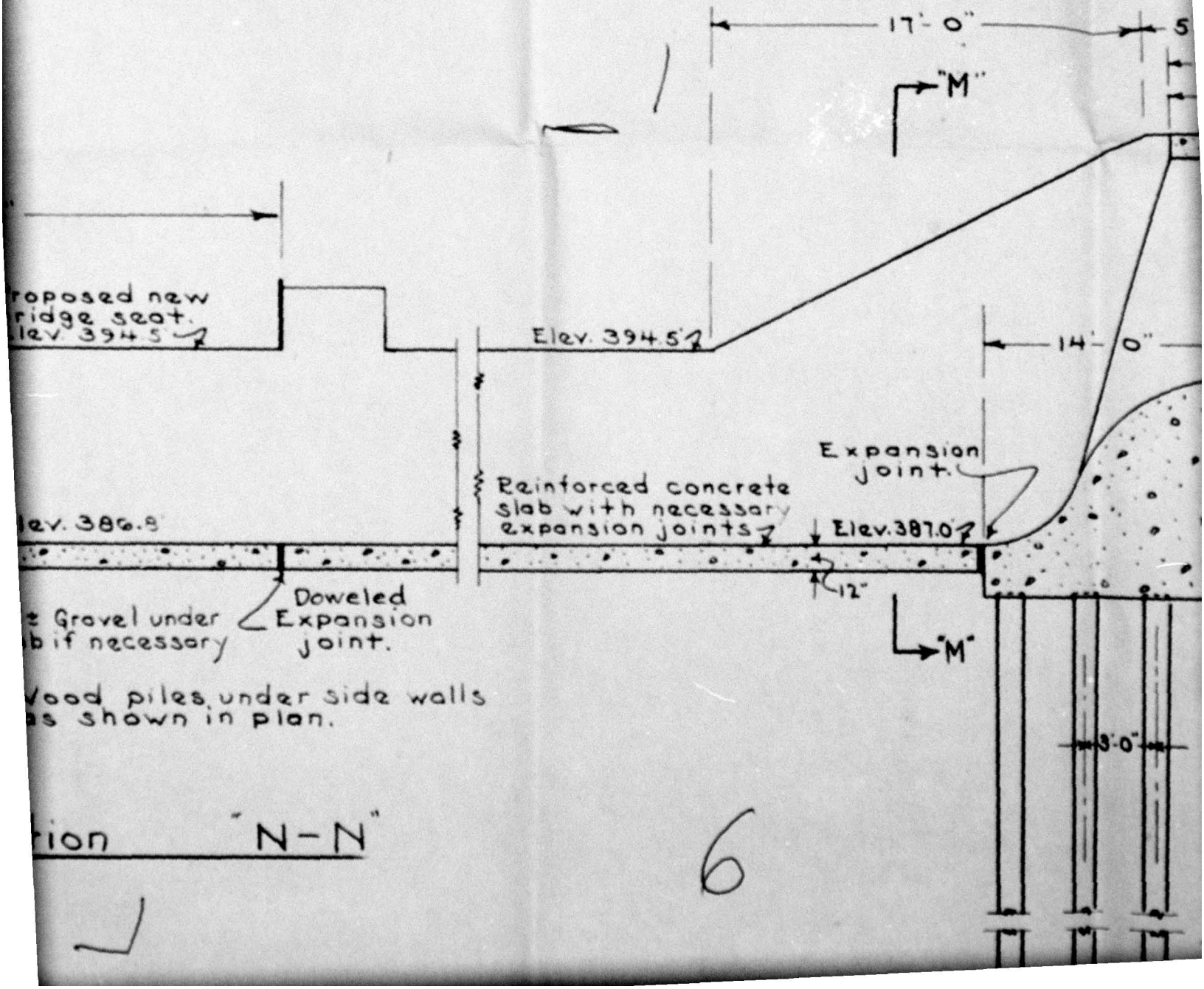
f of Spillway.

Longitudinal Sectio

1

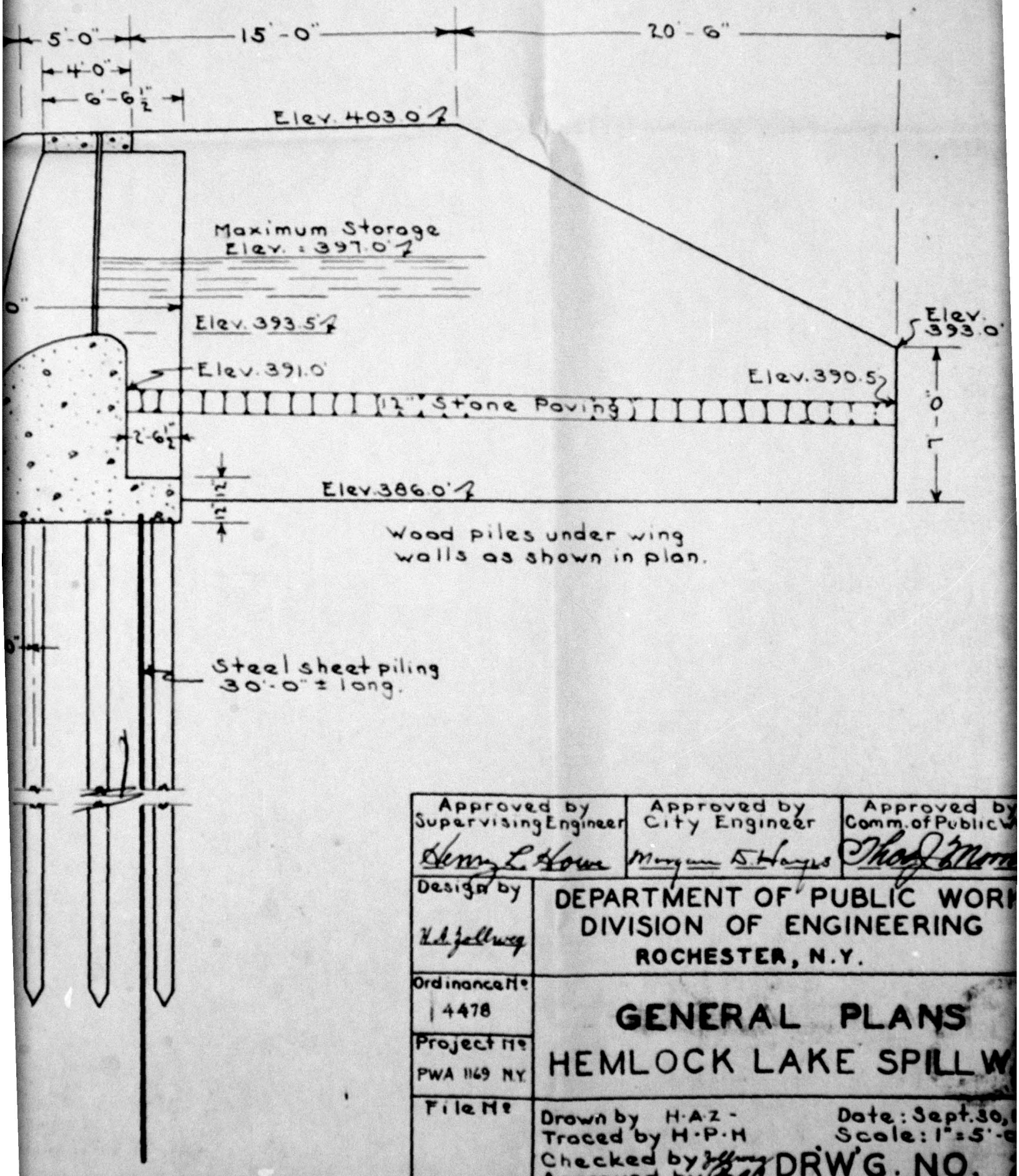


an of East Half of Bridge and Spillway



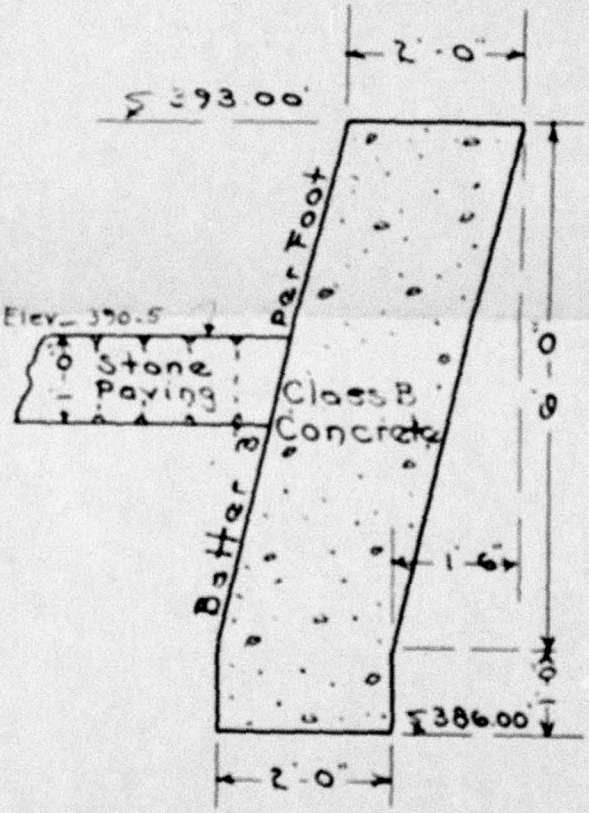
tion "N-N"

6

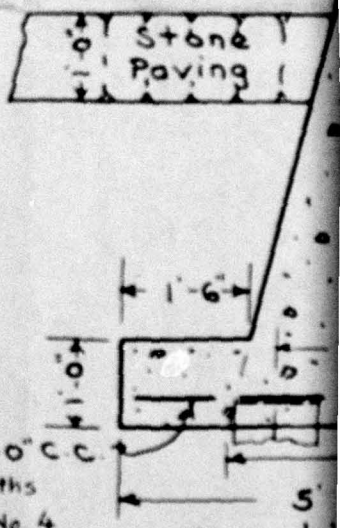


Approved by Supervising Engineer	Approved by City Engineer	Approved by Comm. of Public W
Henry L. Howe	Morgan A. Hayes	Thos. J. Mora

Design by H.A. Zellweg	DEPARTMENT OF PUBLIC WORK DIVISION OF ENGINEERING ROCHESTER, N.Y.
Ordinance No. 14478	GENERAL PLANS
Project No. PWA 1169 N.Y.	HEMLOCK LAKE SPILLW
File No.	Drawn by H.A.Z. — Date: Sept. 30, Traced by H.P.H. — Scale: 1" = 5'-0 Checked by Approved by DRW'G. NO.



Section "B-B"

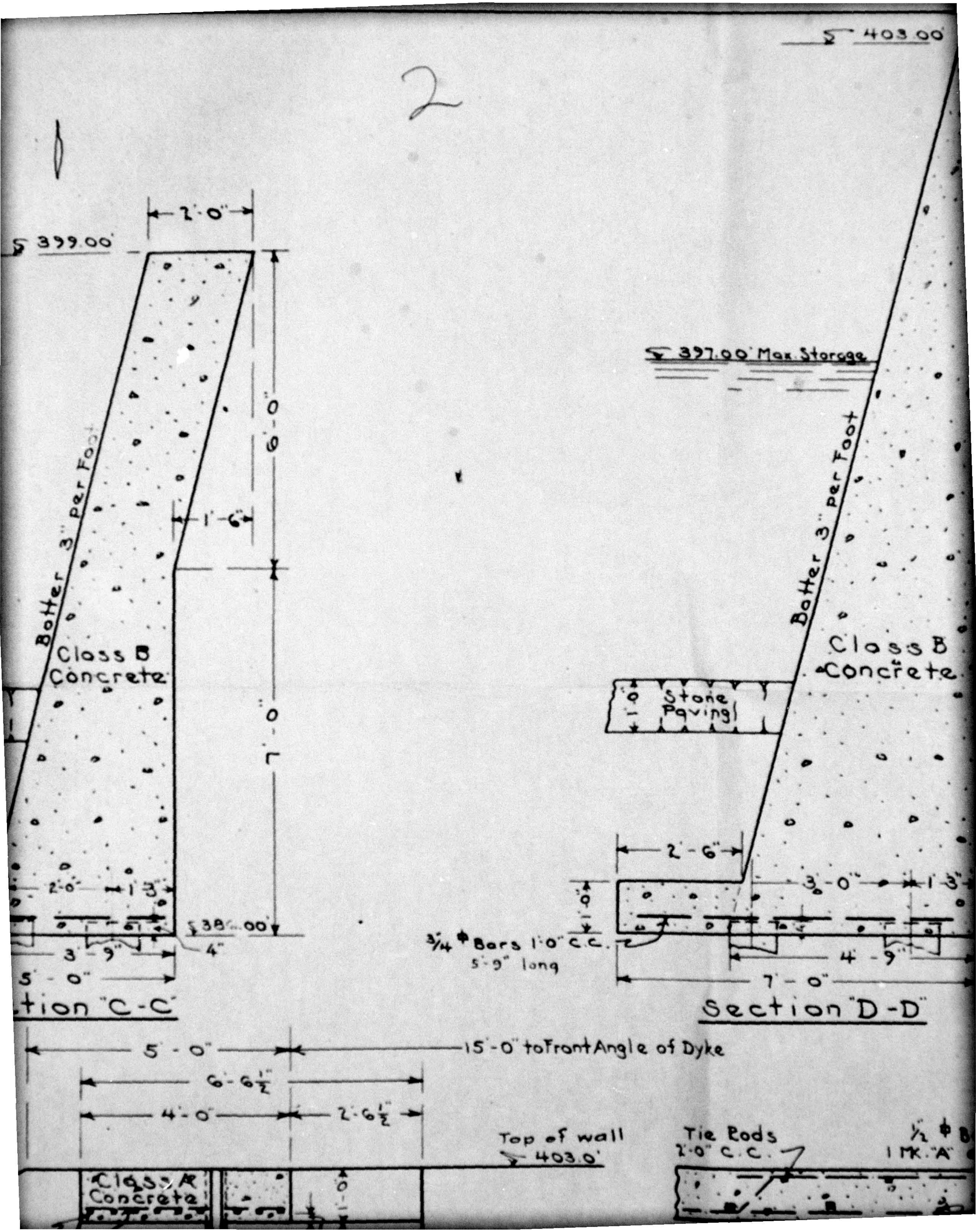


Secti

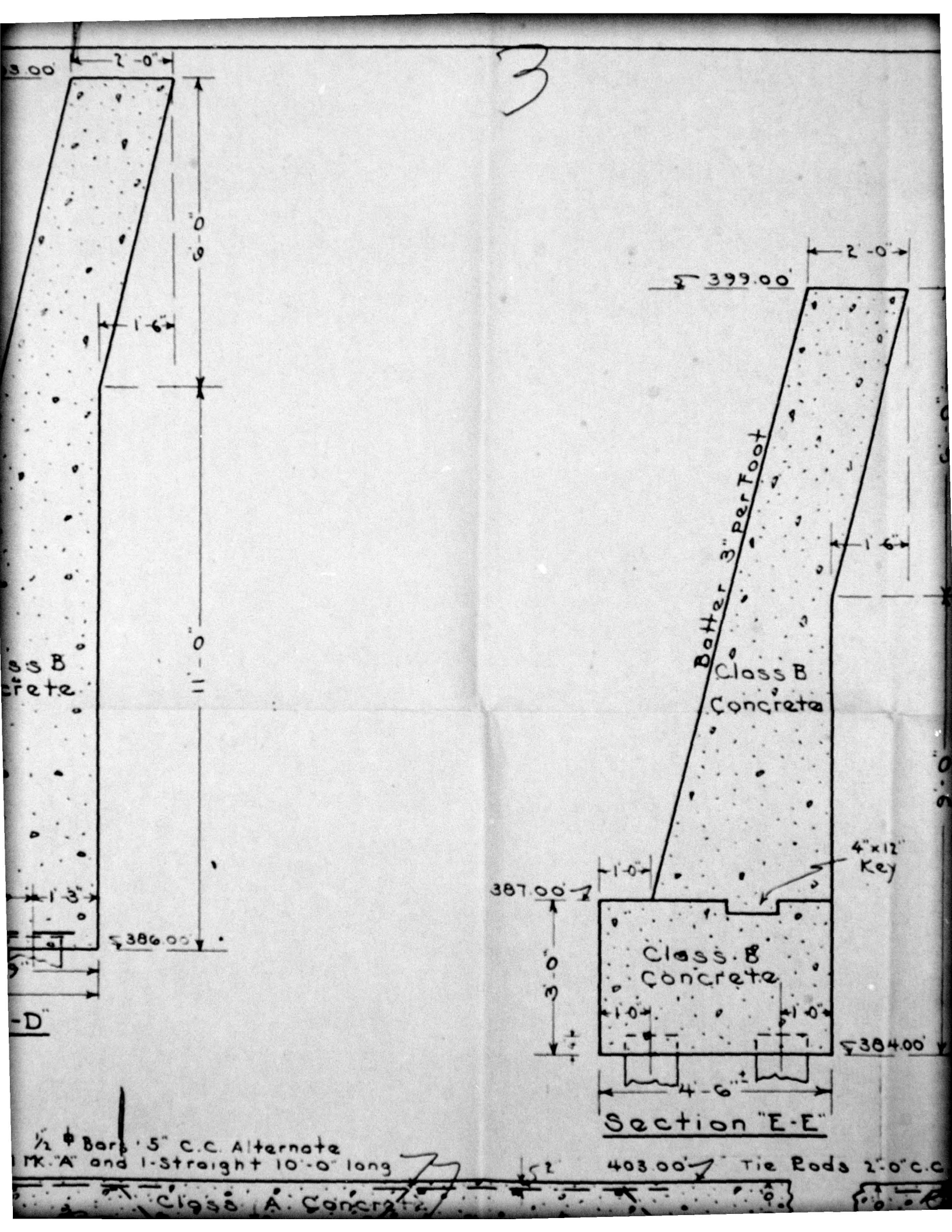
List of Straight Bars

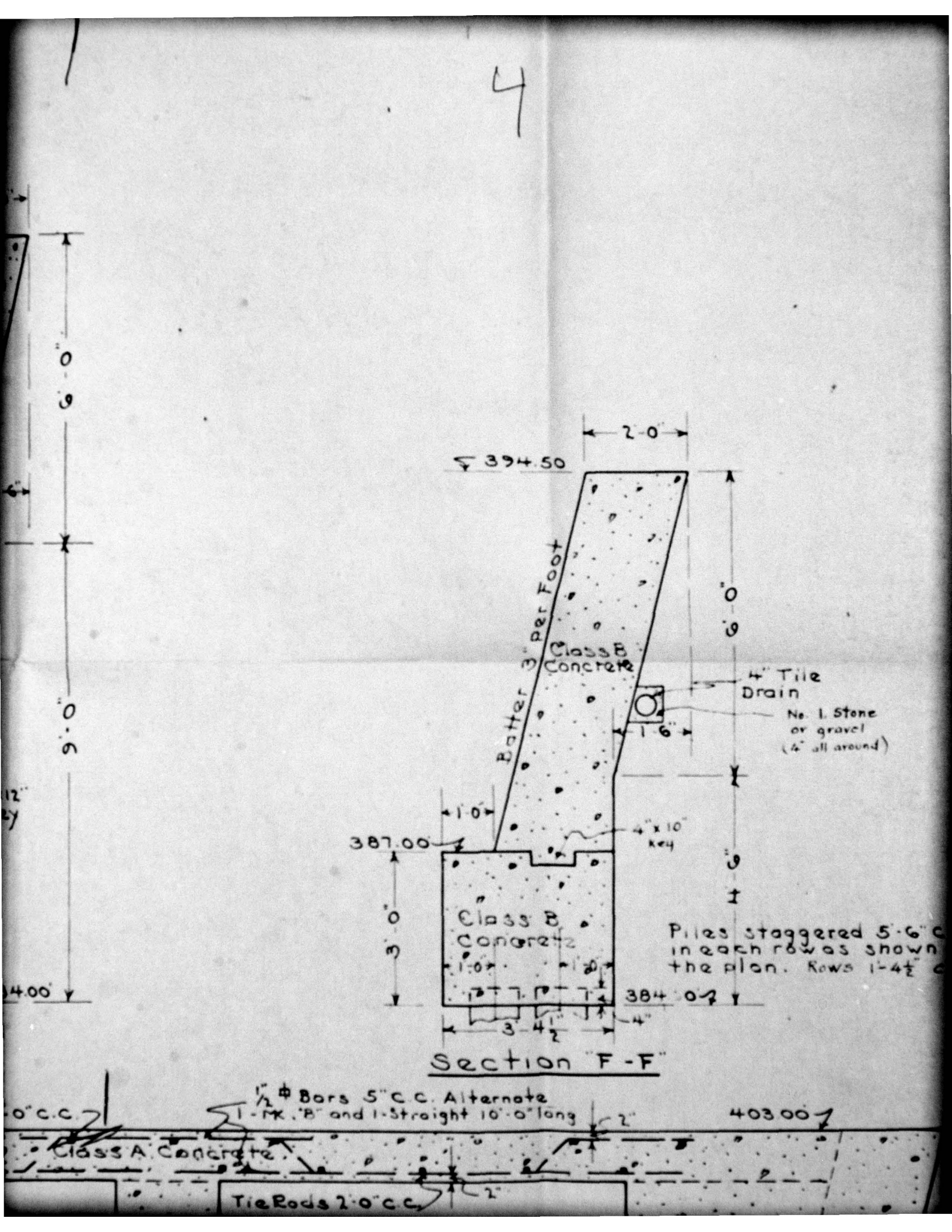
No.	Size	Length	Location	Remarks
78	½" ϕ	3'-6"	Spillway Footing	
117	do	13'-8"	" "	
23	do	77'-8"	" "	
30	¾" ϕ	5'-9"	Spillway Wing Walls	
24	do	Miscl.	" " "	93.0 Lin. ft.

½" ϕ Bars 5" C. to
Alternate
1 - Mk. A
1 - Straight 10'-0" long
For End Span Use
Alternate of



2
403.00'
399.00'
2'-0"
Batter 3" per Foot
Class B Concrete
1'-6"
2'-0"
1'-3"
3'-9"
4"
5'-0"
tion "C-C"
397.00' Max. Storage
Batter 3" per Foot
Class B Concrete
Stone Paving
2'-6"
3'-0"
1'-3"
3/4" φ Bars 1'-0" C.C.
5'-9" long
4'-9"
7'-0"
Section "D-D"
5'-0"
15'-0" to Front Angle of Dyke
6'-6½"
4'-0"
2'-6½"
Top of wall
403.0'
Tie Rods
2'-0" C.C.
Class A Concrete

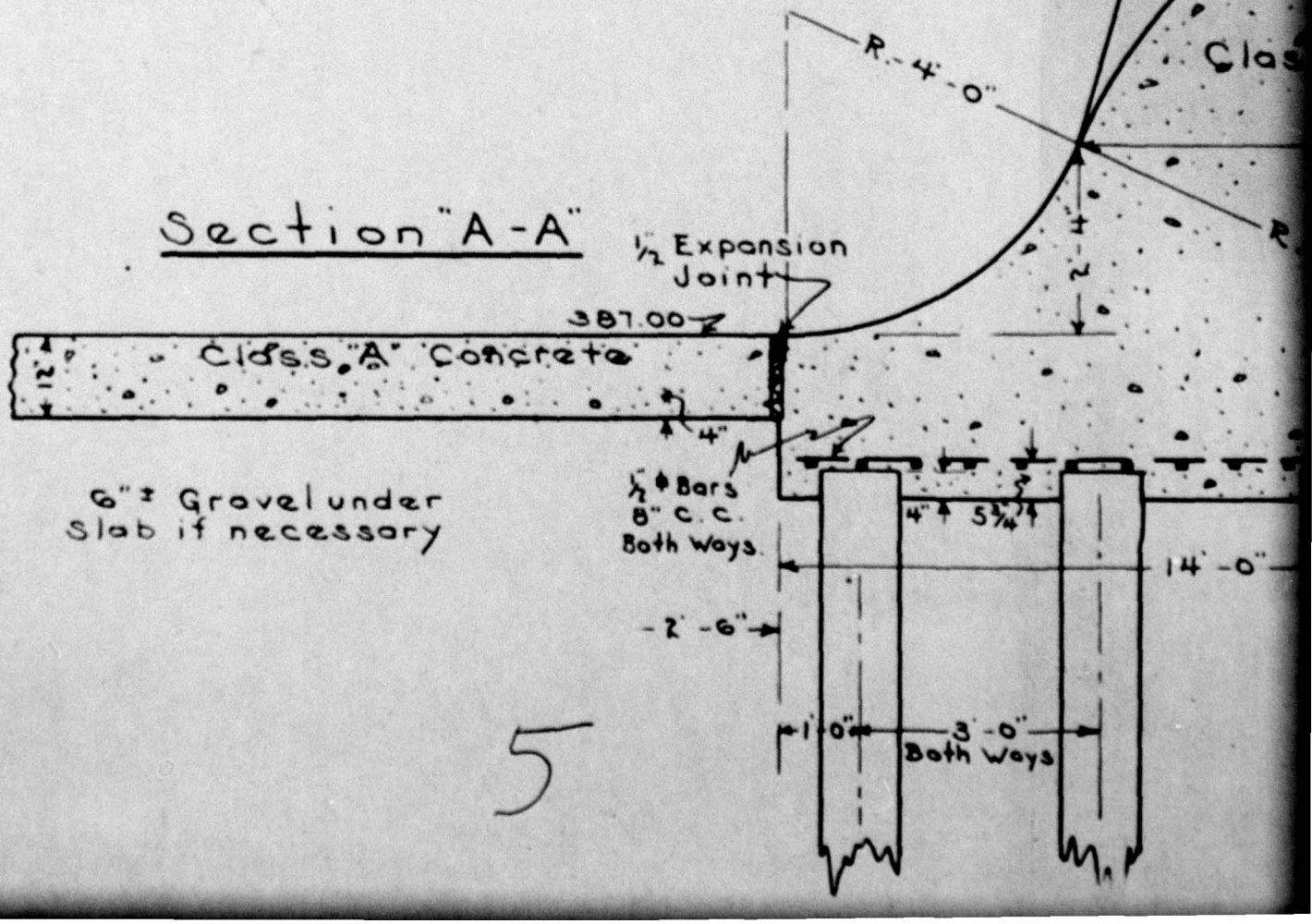

2'-0"
399.00
Batter 3" per Foot
1'-6"
Class B Concrete
4"x12" Key
1'-0"
387.00
3'-0"
Class B Concrete
1'-0"
1'-0"
384.00
4'-6"
Section "E-E"
1'-3"
386.00
-D"
½ ϕ Bars 5" C.C. Alternate
Mk. "A" and 1-Straight 10'-0" long
403.00
Tie Rods 2'-0" C.C
Class A Concrete


2'-0"
394.50
Batter 3" per Foot
Class B Concrete
4" Tile Drain
No. 1 Stone or gravel (4" all around)
1'-6"
1'-0"
4" x 10" Key
387.00
Class B Concrete
1'-0"
1'-0"
7"
7"
7"
384.0
3'-4½"
4"
Piles staggered 5'-6" c
in each rows as shown
the plan. Rows 1'-4½" c
Section "F-F"
½" ϕ Bars 5" C.C. Alternate
1-Mk. "B" and 1-Straight 10'-0" long
403.00
2"
Class A Concrete
Tie Rods 2'-0" C.C.
2"

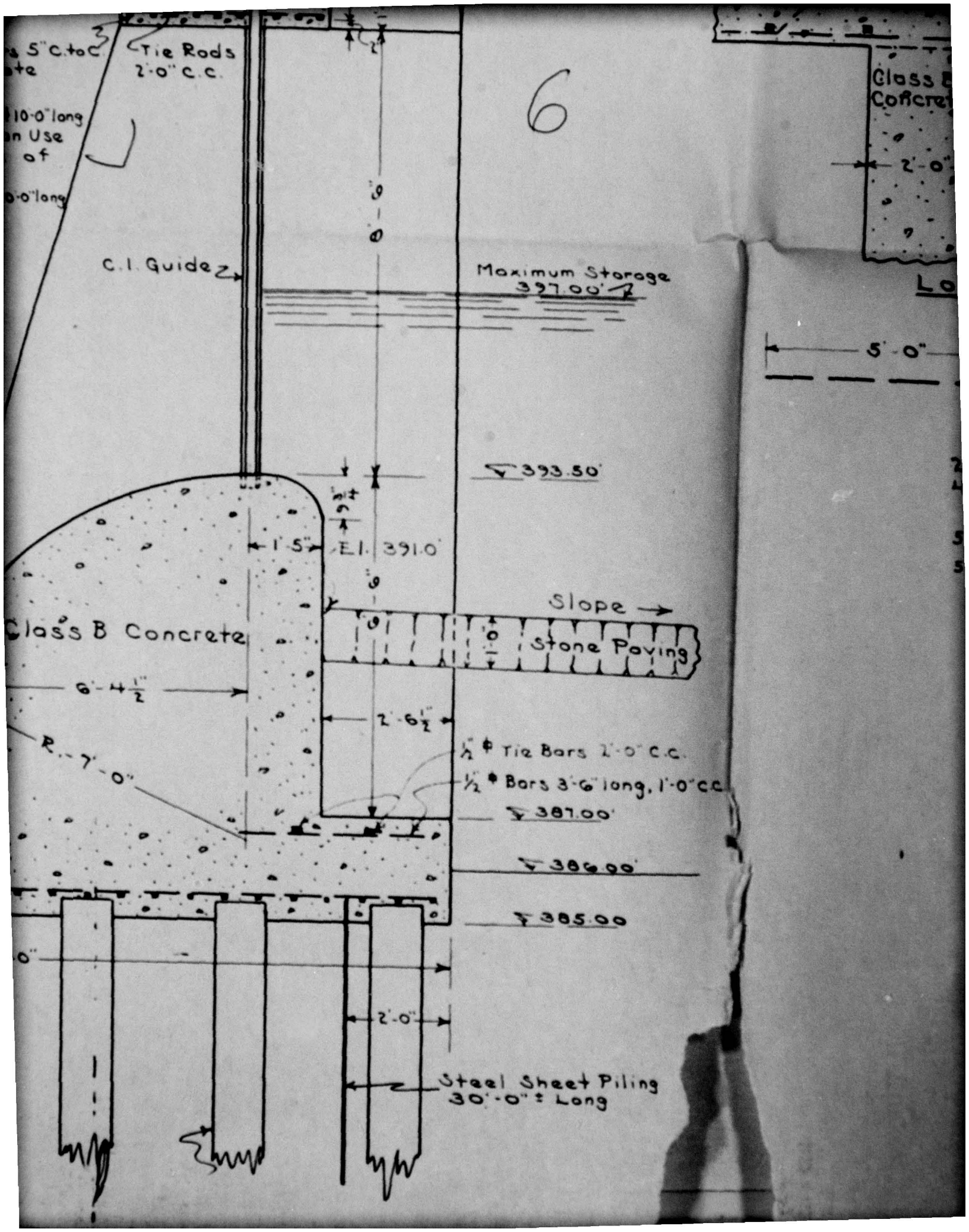
No.	Size	Length	Location	Remarks
78	½" ϕ	3'-6"	Spillway Footing	
117	do	13'-8"	" "	
23	do	77'-8"	" "	
30	¾" ϕ	5'-9"	Spillway Wing Walls	
24	do	Miscl.	" " "	93.0 Lin. ft.
120	½" ϕ	2'-0"	Channel Floor	Slip-dowels
400	½" ϕ	2'-0"	" "	Const. Joint Dowels
100	½" ϕ	2'-0"	Concrete Apron	Slip-dowels
400	½" ϕ	2'-0"	" "	Const. Joint Dowels

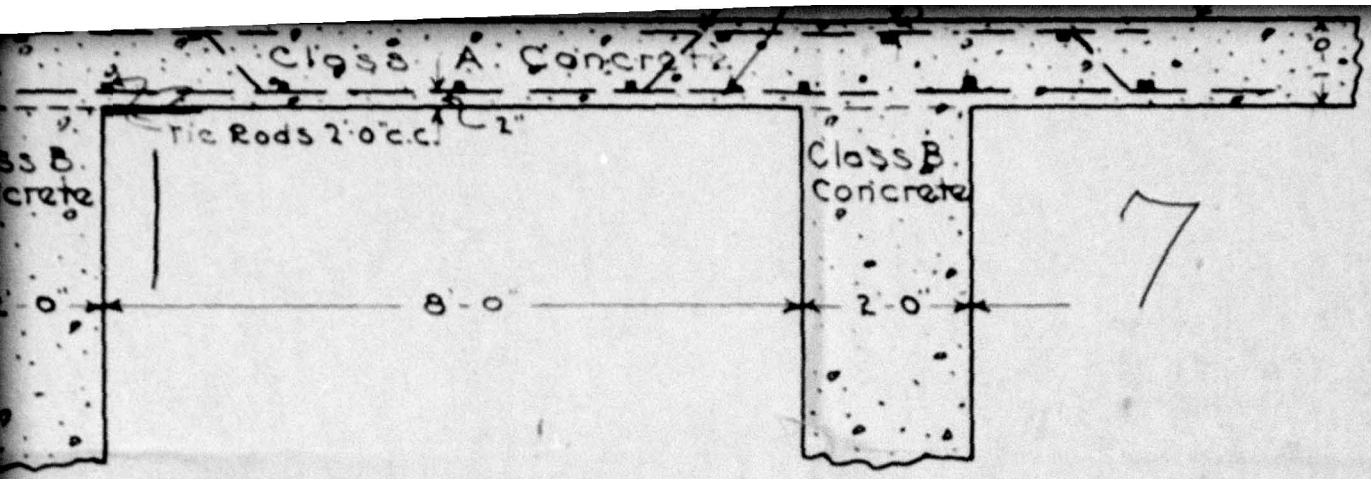
½" ϕ Bars 5" C.
Alternate
1 - Mk. "A"
1 - Straight 10-0" lo
For End Span Use
Alternate of
1 - Mk. "B"
1 - Straight 10-0" long

Note: Bar List for Spillway Walk on Dwg. No. 3
Bar List for Bridge Structure on Dwg. No. 5



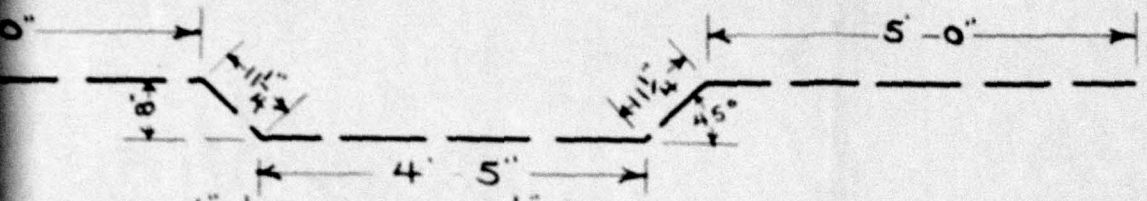
5


6
Tie Rods 2'-0" C.C.
C.I. Guide
Maximum Storage 327.00'
393.50'
1'-5"
El. 391.0'
Slope
Class B Concrete
Stone Paving
6'-4½"
2'-6½"
R = 7'-0"
½" ϕ Tie Bars 2'-0" C.C.
½" ϕ Bars 3'-6" long, 1'-0" C.C.
387.00'
386.00'
385.00'
2'-0"
Steel Sheet Piling 30'-0" ± Long
5'-0"
2'-0"

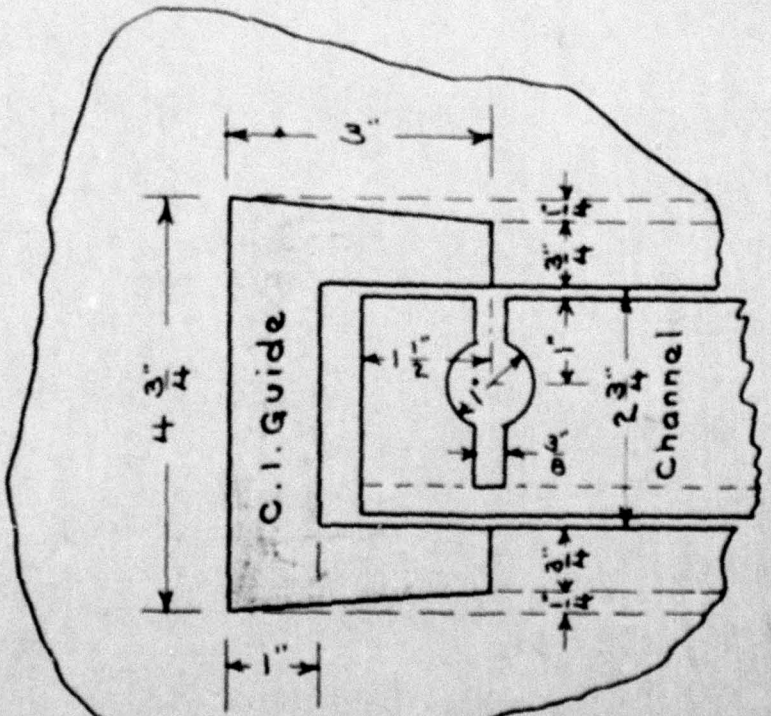


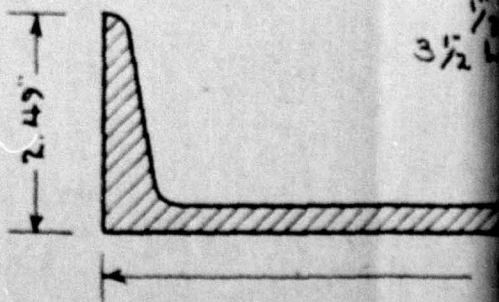
7

Longitudinal Section of Sidewalk



24 - 1/2" ϕ Bars 16'-3 1/2 Long MK. "A"
40 - 1/2" ϕ Bars 10'-0" Long - Straight.
9 - 1/2" ϕ Bars 3'-8" Long - Straight
56 - 1/2" ϕ Bars 1'-1" Long - Straight
56 - 1/2" ϕ Bars 2'-2" Long - Straight



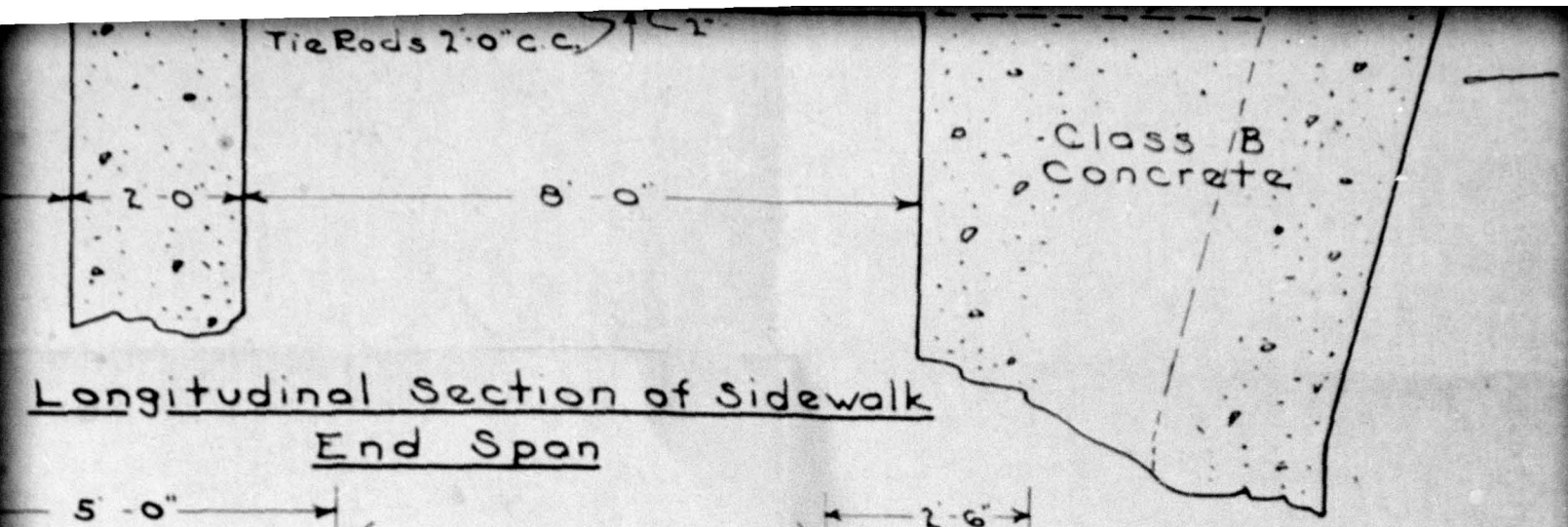


Section of 15

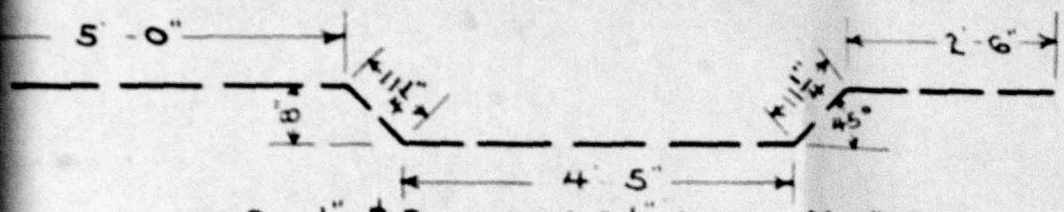
Scale: 1" Full si

Plan View of C.I. Guide and Stop Plank

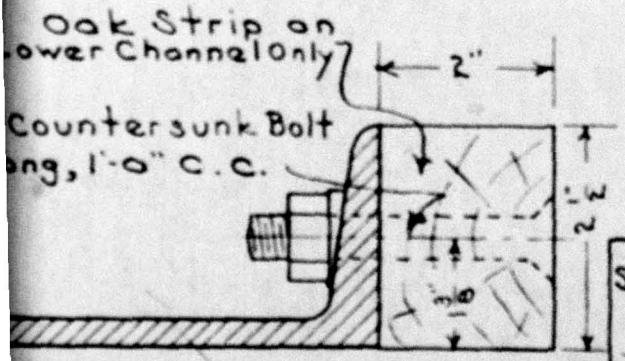
16 Guides 9'-9" long required



Longitudinal Section of Sidewalk End Span



8 - 1/2" ϕ Bars 13'-9 1/2" Long MK. "B"



56 Required

Scale: 1/2"=1'-0"; Otherwise as noted

Approved by Supervising Engineer	Approved by City Engineer	Approved by Comm. of Public Works
Henry L. Howe	Morgan M. Hayes	Thos. J. Morrissey

Design by W. A. Jollway	DEPARTMENT OF PUBLIC WORKS DIVISION OF ENGINEERING ROCHESTER, N.Y.
Ordinance No. 4478	HEMLOCK LAKE SPILLWAY SECTIONS AND DETAILS
Project No. PWA 1169 N.Y.	
File No.	Drawn by W. A. Jollway Date: Sept. 29, 1938 Traced by H.P.H Scale: As shown Checked by Jollway Approved by DWG. NO. 3